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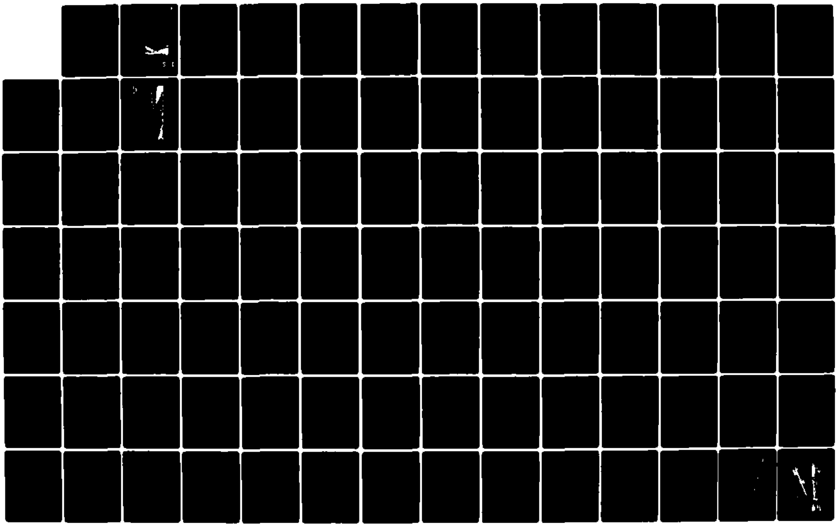

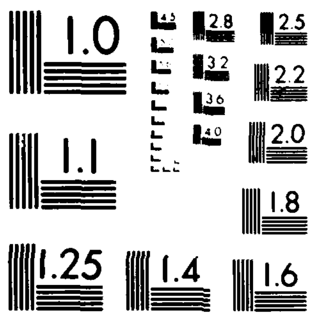
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Project Report Number 8

CULTURAL RESOURCE INVESTIGATIONS FOR THE LYONS FERRY FISH HATCHERY PROJECT, NEAR LYONS FERRY, WASHINGTON

edited by
Randall F. Schalk
with contributions by
Gregory C. Cleveland
Robert R. Mierendorf
Deborah L. Olson
Roderick Sprague

Snake River Country. April 6, 1924.

Laboratory of Archaeology and History
Washington State University
Pullman
1983

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A cultural resource study to identify, test, and make recommendations concerning the cultural resources that might be impacted by construction of the Lyons Ferry fish hatchery. The historic remains of an early 20th century railroad construction camp and three concentrations of prehistoric archaeological deposits were encountered within the project area. Testing of an aboriginal housepit cluster in the hatchery area showed it to be substantially intact and scientifically significant. The decision was made for in-place preservation rather

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Project Report Number 8

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Washington State University

Pullman
1983

The cultural resource investigations for the Lyons Ferry Fish Hatchery Project near Lyons Ferry, Washington, were undertaken for the U.S. Army Corps of Engineers, Walla Walla District, under contract no. DACW68-80-C-0110. All contract information is filed at the Laboratory of Archaeology and History, Washington State University, Pullman, under coding 11F-4970-0013.

Project Reports is a selected series disclosing the results of research in the form of final or interim reports submitted to agencies which have contracted with the Laboratory of Archaeology and History for information on cultural resources.

PREFACE

This final report was submitted to the Walla Walla District, Corps of Engineers as a draft report in September of 1980. Although the draft fulfilled the needs of the District as it stood and was deemed acceptable, a number of editorial changes were required to make the manuscript print-ready. The draft report was prepared shortly prior to our conversion to a word-processing system for all report preparations. It was intended that the entire manuscript would be re-typed into the word processor, subjected to a final editing, and printed as a single-spaced text. Due to financial constraints and an over-worked secretarial staff, however, this plan was not carried out. Ultimately, a decision was made that the more realistic option was to make the necessary revisions on the draft manuscript without re-typing the entire report. Minor editorial changes have been made throughout the text. Addition of a few footnotes and an Addendum provided mechanisms for dealing with points requiring further clarification, for commenting on subjects that were altogether omitted in the draft, or just for enhancing interpretations made in the draft, all in the light of what has been learned while the manuscript was gathering dust on the shelf.

ABSTRACT

This report describes the results of a cultural resource study undertaken by the Laboratory of Archaeology and History under contract with the Walla Walla District of the Army Corps of Engineers. The purpose of the study was to identify, test, and make recommendations concerning the cultural resources that may be impacted by construction of a large fish hatchery at Lyons Ferry. The information assembled in this report should make possible a determination of eligibility.

The historic remains of an early 20th century railroad construction camp, Trestle City, and three concentrations of prehistoric archaeological deposits were encountered within the 67 acre project area. The remains were mapped and subjected to limited subsurface testing. The prehistoric deposits were tested by systematically placed backhoe pits and by hand-excavated tests in housepits and selected locations. The prehistoric remains are those of a residential site and one that was occupied prior to 2,000 years ago.

Two areas of the prehistoric site are so badly disturbed that no further mitigative action beyond monitoring during construction is recommended. That area of the site containing a cluster of aboriginal housepits, is considered to be substantially intact and scientifically significant. While a full-scale excavation of this area is one possible alternative for mitigation, redesign of the hatchery around it is preferable from the viewpoint of both cost and future research needs.

ACKNOWLEDGMENTS

For their good-natured and skillful performances as members of the field crew, we are grateful to Murrel Comfort, Cliff Kurrus, Nick Paglieri, Kim Simmons, Judy Thayer, and Andrew Barsotti. Jerry Lyons served as cartographer and draftsman. Ron Bosley operated the backhoe.

In Pullman, Cathy Eshleman performed secretarial duties and capably assisted in the assembling of the draft of this report. Dolores Lehn and Lorna Elliott typed revisions for the final report. Deborah Olson carried out the laboratory analysis of prehistoric faunal and lithic samples, and compiled the data pertaining to these for Chapter VII and the Appendices. Jennifer Ayers processed the historic materials.

For the rental of a farmhouse near Riparia which provided comfortable field quarters, we are grateful to Don and Judy Jackson of Starbuck.

Kenneth Ames, David Chance, and Alan Marshall shared information and ideas about regional archaeology and geology with the authors.

Colonel Henry J. Thayer and LeRoy Allen of the Walla Walla District of the Army Corps of Engineers assisted the project in a number of ways. Colonel Thayer recognized that in-place preservation of the prehistoric house remains within the fish hatchery was more consistent with current federal policies for historic preservation and also less costly to the government than a data recovery excavation. He deserves particular recognition for his progressive and enlightened attitude towards the management of cultural resources.

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CHAPTER I

BACKGROUND TO THE LYONS FERRY HATCHERY PROJECT

by

Randall F. Schalk

Description of the Hatchery Project

The Snake River Drainage was once one of the most important anadromous fish producing systems in Western North America, and it contributed greatly to commercial and sports fisheries as remotely located as Southeast Alaska and Northern California. Construction of several hydroelectric dams on the Lower Snake and Columbia has had a substantial and adverse effect upon the native populations of anadromous fish. This decline in fish populations has been especially severe in the Snake Basin since completion of Ice Harbor, Lower Monumental, Little Goose, and Lower Granite Dams during the past two decades. As a response to this tremendous and economically important loss, Congress has authorized the Lower Snake River Fish and Wildlife Compensation Plan as a part of the Water Resources Development Act of 1976 (22 October 1976), Public Law 94-587. The Compensation Plan calls for the substitution of aquaculture or fish propagation for the dwindling wild populations of fish.

The archaeological study discussed in this report was undertaken to evaluate those cultural resources that will be impacted by one fish hatchery which will be constructed at Lyons Ferry, Washington, approximately one mile west of the mouth of the Palouse River. The hatchery project will directly impact an area of approximately 67 acres on a broad flat of the Snake River immediately downstream from the Joso railroad trestle (see Figure 1). This area was selected as a hatchery site

Figure 1. View of Lyons Ferry Hatchery Project area looking southeastward up the Snake. The Hatchery will be constructed over the triangular area between Joso Trestle and the dunes in the foreground. Mouth of Palouse River is at far left.

because of the nearby availability of groundwater with acceptable chemical and thermal properties for anadromous fish rearing. This aquifer, which is apparently recharged continuously from the Snake River, was first discovered in 1969 during the unsuccessful attempt to protect the Marmes Rockshelter archaeological site from inundation due to flooding of the Lower Monumental Reservoir. Water from this aquifer will be tapped by eight wells and then pumped nearly two miles to the Lyons Ferry Hatchery through two large parallel pipes that will be laid underground or underwater.

The hatchery itself will be a large and complex installation including spawning, incubation, and rearing facilities, storage for feed, chemicals, and equipment, a maintenance shop, garage, fish collection facilities, water supply facilities, and wastewater treatment facilities. In addition, there would be a visitor's center and eight permanent, single-family dwellings for the hatchery employees. The proposed lay-out for the various buildings and facilities within the hatchery as of July, 1980, is illustrated in Figure 2.

The Lyons Ferry Hatchery will be constructed by the Walla Walla District of the Corps of Engineers and, when completed, will be operated by the Washington Department of Game. At the time the archaeological study reported here began, the construction of the hatchery was scheduled for July, 1980, through September, 1982. Initiation of construction, however, has been delayed and the present plan is to begin in January of 1981.

Project Setting

Along this stretch of the Lower Snake, the river has cut a steep canyon through layers of Miocene basalt, and the canyon walls generally

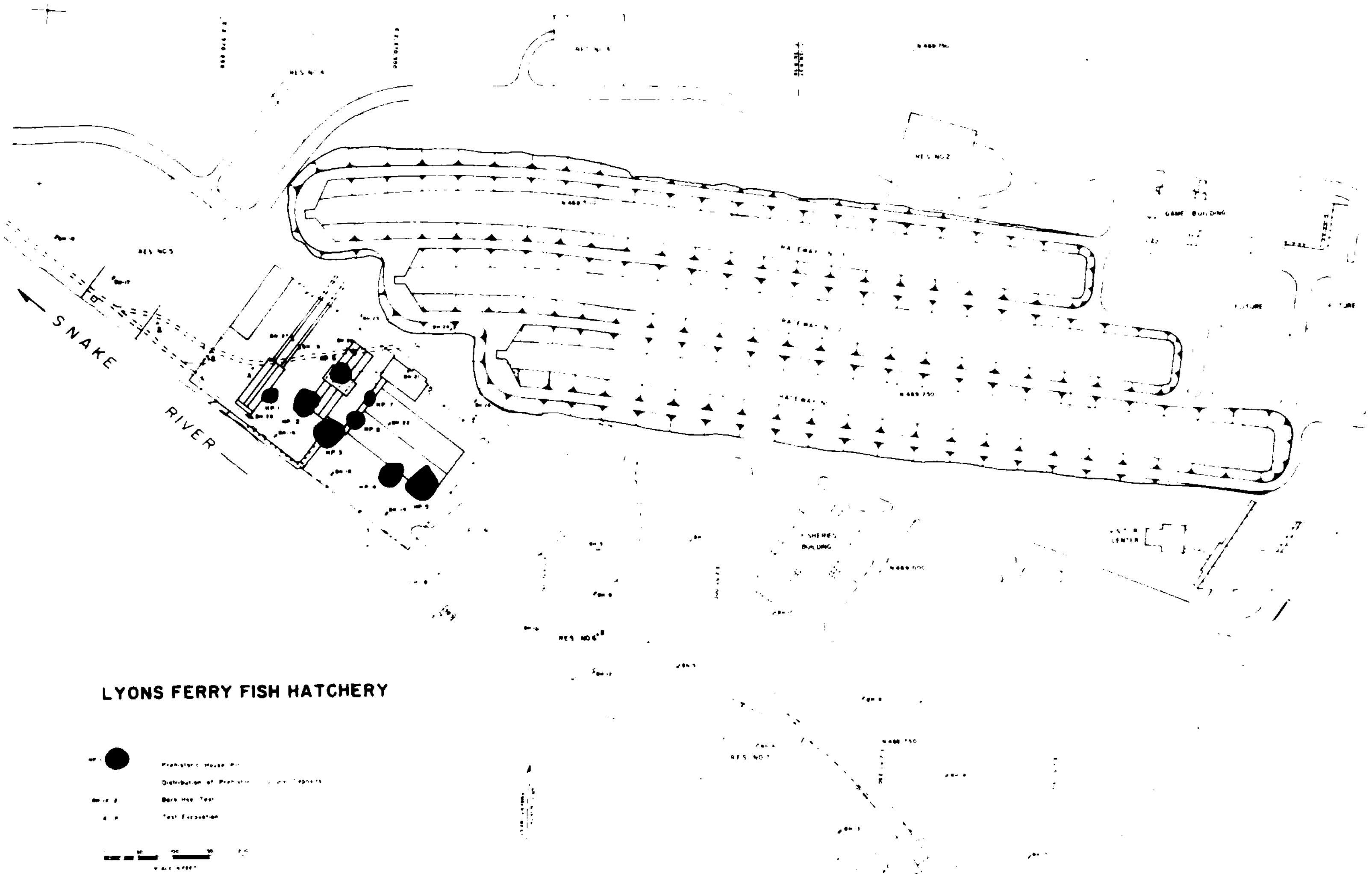

Figure 2. Plan of proposed Hatchery facilities.

rise in gigantic steps to the rolling hills more than 600 feet above. Prior to the reservoirs there were in many areas of the Lower Snake, two lower terraces situated just above the normal river level. In the vicinity of Lyons Ferry, the lower of these terraces is now covered by the reservoir, but the upper one is the proposed setting for the hatchery. This second terrace has active and inactive dunes across portions of it.

Pleistocene floods that resulted from ice-damming of rivers have produced a landscape in this region that is unusual throughout the world--the Channeled Scablands. These floods scoured the loess and the basalt bedrock itself over large areas in this portion of the Plateau. Bretz Bar, which lies on the opposite side of the Snake from the hatchery site, is a huge gravel bar formed by catastrophic flooding, and it bears the name of the man who originally recognized the geological significance of the scablands. The Palouse Falls, a 185 foot cataract which lies about 5 miles upstream from the mouth of the Palouse River, was also formed by the floods, and the entire Palouse Canyon reflects the awesome power associated with such tremendous volumes of water. The presence of the falls is especially important to prehistoric land use insofar as it effectively blocks the upstream passage of anadromous fish.

Vegetation along the bottom of the canyon is dominated by sagebrush and bunchgrass and the ground, if vegetated at all, tends to be sparsely covered due to the scarcity of precipitation. Because of the rocky and thin soils over the scablands, grazing is the major pattern of land use in the vicinity today. Where loess has not been eroded away (generally at higher elevations), wheat farming is the major form of land use.

Owing to the rugged character of the canyon of the Lower Snake, a major tributary such as the Palouse permits human access in and out

and favors intensive and long-term utilization of a spatially restricted area by quite different cultural systems. Numerous archaeological sites, the Mullan military road, a ferry, railroad trestle, and more recently a highway bridge, all converge within the vicinity of the mouth of the Palouse.

The Archaeological Survey and Testing

The archaeological work described in this report was designed to survey, test, and evaluate the significance of any cultural resources within the boundaries of the hatchery project area. Two archaeological sites had been previously reported in this immediate area: a prehistoric campsite (45FR36) and the historic remains of the construction camp (45FR51) associated with the building of the Joso railroad trestle.

The prehistoric site was first reported in 1960 during the survey of the right-of-way for the Pacific Gas Transmission Company's Alberta to California pipeline (WSU archaeological site survey form). In the report of this survey, Mallory (1961:5) described the site as follows:

> This site covers an area 200 yards (NW-SE) by 30 yards (NE-SW) which is dissected by the abuttment of a railroad trestle. The cultural material, i.e., river mussel, fire broken rock, bone fragments, stone chips, are in a narrow lens which is approximately 12 feet above the river and 3 feet below the surface of the ground.
>
> This site, like 45WT2, has been extensively disturbed by amateur diggers but in conjunction with 45WT2, some small effort could possibly yield worthwhile results.

Although this site was obviously in close proximity to the hatchery project, the description of its extent would lead one to suspect that it would have largely been inundated with the completion of Lower Monumental Dam.[1]

The second site, Trestle City (45FR51), was first reported by Roderick Sprague in 1966 (WSU archaeological site survey form). It was

described as a "surface collection of historic glass, pottery, and iron" located on the flat immediately downstream from Joso Trestle.

In January of 1978, a four-person crew from the Washington Archaeological Research Center directed by Gary Wesson (Wesson 1978) conducted a 2-day reconnaissance survey and test for the Lyons Ferry Hatchery. The survey of surface of the area revealed three concentrations of prehistoric material along the southern margin of the hatchery project area. At least five possible aboriginal housepits were noted in one of these areas (Area III). In addition, an historic dump was located though no details were reported about the distribution and character of other historic material. Single test pits were excavated in each of the three areas of prehistoric material. The pits all yielded quantities of stone chipping debris along with small amounts of bone and mussel shell. The bottom of cultural deposits was not reached in any of the test pits; though two of the pits were only excavated to a depth of 40 centimeters, a third extended to a depth of a meter and was still producing numerous flakes. It was concluded that it was not possible to assign the deposits to a cultural phase or period of time owing to the absence of diagnostic artifacts, and Wesson recommended further excavation in the area.

As construction of the hatchery was imminent more than two years after Wesson's reconnaissance, information that would be essential for a determination of eligibility by the Corps of Engineers was still not available. Knowledge of site extent horizontally and vertically, internal artifact/debric densities, state of preservation, stratigraphic structure, and the site's likely role in a settlement system was either insufficient or nonexistent. The archaeological background, survey, mapping, and testing discussed in the remainder of this report was planned with the

intent of assembling a document that would permit a determination of eligibility for the National Register.

It was anticipated in the planning stage of this project that the prehistoric and historic remains in the project area would involve somewhat distinctive problems and separate procedures. Accordingly, a division of labor was established for the collection of data during the fieldwork; Cleveland supervised the investigation of the historic and Schalk the prehistoric remains. In addition, Dr. Roderick Sprague of the University of Idaho was retained as a consultant to prepare a historical background, to give advice as to the sort of archaeological data that would be necessary for evaluating the nature and significance of the historic resource, and generally to provide insight into the local and regional history that could not be achieved by others of us on such short notice. Sprague had originally reported the presence of the archaeological remains of Trestle City, supervised and reported the excavations of the historic Indian cemetery at the mouth of the Palouse, and has had a longstanding involvement in historical archaeology in this region.

Robert Mierendorf agreed to prepare a paper that would lend a geological/depositional context to the prehistoric deposits in the project area. He was able to spend a day on the site examining profiles of test pits, most of which stood completed at the time of his visit.

Sprague's paper, along with chapters on chronology and previous work in the Lower Monumental Reservoir are intended to provide the background for site-specific discussions of the project area in Chapter 6. Also, information presented in these background chapters was assembled to give some framework within which significance of the cultural resources within the project area could be evaluated. The final chapter of this report presents recommendations and alternatives for mitigating the impacts of the fish hatchery upon archaeological remains.

NOTES

1. To prevent possible confusion, it should be pointed out that this site described by Mallory is not the same site described by Osborn (1948) though both are designated 45FR36. The site referred to by the earlier Smithsonian survey was described as follows:

> 45FR36 is a camp or village and possibly a burial site. It is ca. 600 feet long and 300 feet wide. Ths soil is sandy, blow-outs are common. The depth of the fill, and consequently the depth to which cultural material extends, has not been determined. Trade material, beads and copper tubing, was present on the surface. (Osborn 1948:10)

A map included in Osborn's report (Osborn 1948:Sheet No. 2) indicates that this site is situated at the mouth of the Palouse River and is definitely not the same one which Mallory described 13 years later. Osborn makes no mention of a site under the railroad trestle, and it is likely that the site there was either missed during the Smithsonian survey or was simply not considered worthy of mention. There were, then, two distinct archaeological deposits designated 45FR36, but they are separated by a distance of several hundred meters.

Although there has been a considerable amount of archaeological activity in this immediate vicinity over the years, the large aboriginal housepits downstream from the trestle were apparently not discovered prior to Wesson's effort in 1978. There is now reason to believe that these housepits were once part of an archaeological deposit that stretched continuously upriver at least through the site Mallory recorded as 45FR36 under the trestle. Consultation with Alice Gronski, records librarian for the Washington Archaeological Research Center, resulted in a decision to call the housepit area 45FR36C. The Palus burial site has previously been designated 45FR36B and the Palus Village simply 45FR36.

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1961 An archaeological survey of Pacific Gas Transmission Company's Alberta to California pipeline system: M.P. 108.0 - M.P. 722.0. *Laboratory of Anthropology, Washington State University, Reports of Investigations* 12.

Wesson, Gary
1978 Test excavation of the proposed fish hatchery and well sites at Lyons Ferry, Washington. Washington Archaeological Research Center, *Project Report Number 60* (Revised version), Washington State University, Pullman.

CHAPTER II

A CHRONOLOGICAL PERSPECTIVE ON HUNTER-GATHERER LAND USE STRATEGIES IN THE COLUMBIA PLATEAU

by

Randall F. Schalk and Gregory C. Cleveland

The Columbia Plateau has frequently been afforded the dubious distinction of being a culture area that has no characteristics that are different from those of neighboring areas.

> This is an area which has failed to set itself off by the development of any distinctive culture of its own--it is primarily a region of absences and low intensity culture (Kroeber 1939:55; Spinden 1908:270). This is especially evident when the Plateau is viewed against the neighboring Plains and Northwest culture areas, both of which were flowering so exuberantly and colorfully when white contact occurred. Rather, what we find here is a series of subareas reflecting varying degrees of influence from the Plains on the east or the Northwest coast on the west (Suphan 1974:97).

Anthropologists have often characterized the Plateau as a refugium for traits which diffused from surrounding areas. Even the Great Basin has on occasion been pictured as a "donor" of traits to this "recipient" culture area. Northwest Coast influence is seen in the greater fishing

dependence of groups along the western Plateau while the mounted groups of the southeastern Plateau are viewed as having been immersed in culture traits from the Plains. Verne Ray (1939) defended the integrity of the Plateau as a culture area of full standing by arguing that these influences were recent "overlays" upon a traditional substratum of traits that were truly distinctive to the Plateau. In both views, however, the culture area concept was intimately associated with a normative and diffusionistic view of culture. This same theoretical framework has been central to most archaeological inquiry in the Plateau up to the present.

In varying degrees, Plateau archaeologists have turned the culture area concept on its edge; in the place of culture areas based upon distributions of culture elements in space, they have formulated phase chronologies based upon the distributions of cultural traits in space and time. In the Plateau, projectile point forms and other lithic items are the principle cultural traits with which nearly all chronologies have been constructed (Butler 1959; Swanson 1962:41-50; Rice 1965; Warren 1968:17-21; Nelson 1969:8-93; Sanger 1970:111-112; Grabert 1968:149-154; Turnbull 1973:107-111; Chance 1977:151; Leonhardy and Rice 1970). Our current understanding of temporally distributed patterning in the archaeological record of the Plateau has largely been formulated within a diffusionist and normative concept of culture, and regional chronologies tend to be most useful for research questions posed within the same theoretical framework (Dancey 1973:2). Because we see the nature of archaeological questions rapidly shifting in new directions, this chapter is an attempt to broadly characterize the

Plateau archaeological sequence in terms of settlement and subsistence systems. This effort necessarily involves reliance upon archaeological literature in which these subjects were rarely the primary ones investigated or reported. Although we focus on the Columbia Plateau, the evenness of that coverage is conditioned by the greater amount of work that has been done in the middle Columbia and lower Snake and our own familiarity with those same regions. In the following sections of the paper, we discuss the historical developments that have resulted in our present knowledge of the cultural sequence, a 3-stage descriptive model of Plateau settlement-subsistence systems.

A History of Chronological Inquiry in the Plateau

The discussion here is singularly aimed at summarizing research that has lead up to the cultural sequence currently known for the Plateau. It is not necessary for our purposes to elaborate upon the general history of archaeology in the area, and the interested reader will find other sources that delve into the broader historical and sociological aspects for the Columbia Plateau (Osborne 1956), the entire Northwest (Sprague 1973), Idaho (Butler 1968), and British Columbia (Carlson 1970).

Prior to the 1950s, archaeologists working in the area had largely failed to identify evidence for prehistoric culture change. Investigations were mainly directed towards the question of cultural historical relationships between the Plateau and surrounding areas, and the quest for archaeological sites with long occupational sequences had not yet commenced. Operating under an assumption of the very limited

antiquity of aboriginal occupation, interest was focused upon the establishment of routes and directions of movement of peoples over quite broad geographic expanses. The archaeological remains were interpreted largely as evidence of ethnic or cultural similarity between the original occupants of the area--their places of origin and their ultimate destinations.

Harlan I. Smith, an archaeologist with the Jesup North Pacific Expedition, performed the earliest exploratory work in both the Canadian and American portions of the Plateau around the turn of the century. In the vicinity of Lytton and the Thompson River of British Columbia, he surveyed, excavated, and examined private collections between 1897 and 1902 (Carlson 1970). In 1903, Smith investigated the Yakima Valley and Priest Rapids regions of central Washington (Smith 1910). In his publications, Smith described housepit villages, burials, cremations, storage pits, petroglyphs, cairns, and numerous artifacts. Although he noted some important distributional facts about certain kinds of sites, these were spatial rather than temporal. Herbert J. Spinden of the Harvard Peabody Museum conducted archaeological and ethnographic fieldwork in the regions between the Salmon and Clearwater rivers of north-central Idaho during the summer of 1907 but mentioned no evidence for culture change (Spinden 1907).

The first research which attempted to recover a chronological sequence in this area by means of stratigraphically controlled excavations was done by W. Duncan Strong, W. Egbert Schenk, and Julian H. Steward of the University of California in the years 1924-1926. This

work was done in the Dalles region on the Columbia (see Figure 3), an area that was selected for study for deliberate purposes:

> The vicinity of the Dalles was selected because of the coincidence of geographical factors vital to man, such as the abrupt change from a humid to an arid climate, the impediments to navigation (rapids and falls), and the favorable conditions for taking large quantities of salmon, and because these would seem likely to have been attractions to man from a very remote period (Strong et al. 1930).

Although their rationale for choosing this study area proved to be sound in subsequent work in this vicinity (Cressman 1960; Caldwell 1956; Butler 1959), this project met with limited success in the establishment of a long occupational sequence. Excavations were made in several sites, but their attention was concentrated on Wakemap Mound, a deep midden at the head of the famous Long Narrows which contained more than four meters of occupational debris. Without any control of absolute time involved in the accumulation of this deposit, its depth suggested the potential for considerable age (Strong et al. 1930:28-29). Indeed, their excavations provided evidence of a change in house forms as well as frequency shifts in certain artifacts (e.g., bone tools), but from the extensive excavations conducted at this site in later years (Caldwell 1956; Butler 1960), we now know that these deposits accumulated during the last 2,000 years or less. As a result of this rather fortuitous investment of their efforts, this work produced little in the way of chronological pattern recognition.

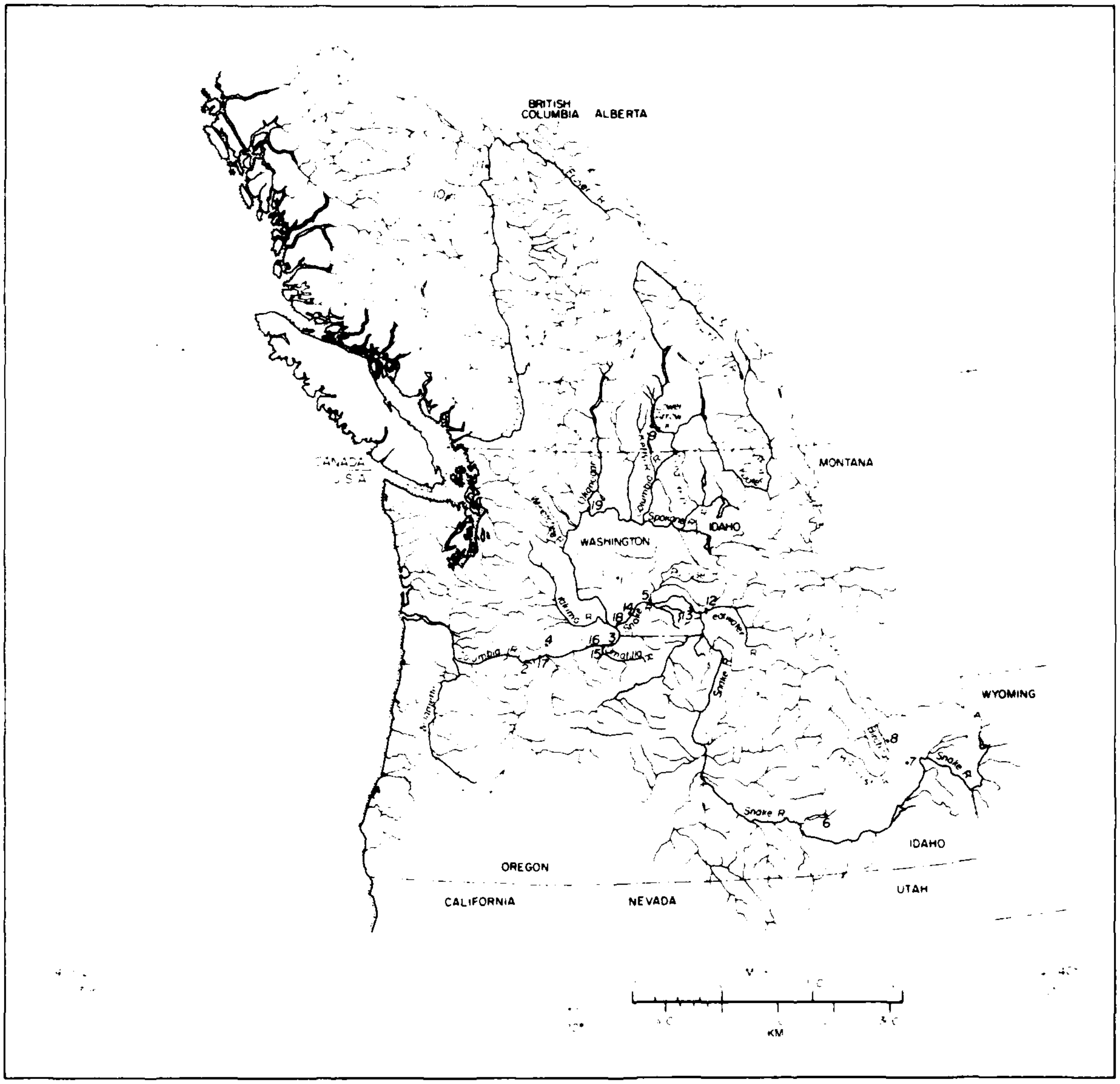

Figure 3. Selected archaeological sites on the Columbia-Fraser Plateau: (1) Lind Coulee, (2) The Dalles (Five-Mile Rapids, Wakemap), (3) Hat Creek, (4) Goldendale, (5) Marmes Rockshelter, (6) Wilson Butte Cave, (7) Wasden, (8) Birch Creek, (9) Cayuse Creek, (10) Tezli, (11) Punchaw Lake, (12) Hatwai, (13) Timothy's Village, (14) 3-Springs Bar, (15) Umatilla, and (16) Lower Blalock Island.

Between 1926 and 1934, Herbert W. Krieger of the U.S. National Museum of Ethnology explored an extensive area between the mouth of the Yakima River and the Canadian border along the Columbia (Krieger 1927; 1928; 1935); in 1936 he carried out archaeological activities in the Bonneville Reservoir (Phebus 1978). The few pages of reporting that resulted from his efforts indicate that his fieldwork was unsystematic even for the time and that he was not seeking or expecting to find evidence for a cultural sequence.

The last archaeological project prior to World War II relevant to an understanding of the development of a chronological framework was that conducted by the Columbia Basin Archeological Survey. This work was the salvage effort associated with Grand Coulee Dam and was reported by Donald Collier, Alfred E. Hudson, and Arlo Ford (1942). A considerable variety of sites were located and excavated, but the investigators were only able to distinguish two categories of sites: prehistoric and post-contact. It was their conclusion that there was no evidence for culture change. In this, as in the other early archaeological expeditions, we see how the theoretical expectations of archaeologists determine the results they achieve with respect to chronological or any other questions. There were no anticipations for the kind of evidence indicative of culture change and without those expectations, potential evidence would not have been perceived as such even when encountered. In the absence of some dramatic surprise such as the association of man and extinct animal, it is doubtful that most kinds of evidence for culture change could have been recognized.

For the most part, the extensive archaeological work done during the post-World War II years by the Columbia Basin Proect of the Smithsonian River Basin Survey continued to describe a temporally undifferentiated archaeological record. The proposed reservoirs of Oregon, Washington, and Idaho were surveyed, and excavations were conducted at many sites. The general consensus among archaeologists remained that human occupation of the area as confined to the last 2,000 years and that the archaeological record reflected a continuity of adaptation similar if not identical to the ethnographically known systems (Swanson 1962:1).

Three developments may be identified as playing a key role in eroding this consensus in the early 1950s. The first development was the model of post-glacial climatic change that emerged in the last 1940s. Antevs (1948) proposed a tripartite scheme for Holocene climate in which there was an early interval of climate similar to that of today (the "Anathermal": 9,000-7,000 B.P.), followed by a period of significantly warmer and dryer conditions (the "Altithermal": 7,000-4,500 B.P.), followed lastly by a period of moderately warm conditions essentially the same as the present climate (the "Medithermal": 4,500-present). At about the same time, pollen studies from seven Northwest bogs (Hansen 1947) suggested a post-glacial forest succession in basic agreement with Antevs' climatic sequence.

The second development was, of course, radiocarbon dating in the late 1940s (Taylor 1978). This technique also had the secondary effect of permitting absolute age estimates of the volvanic pumicites that

occur in sediments and archaeological sites over much of the Plateau. Mt. Mazama pumicite, for example, was dated at 6,700 B.P. and subsequently served as a time stratigraphic marker in archaeological studies.

The third development was the discovery of archaeological remains in deposits which were recognized geologically to be of considerable antiquity at the Lind Coulee site in southeastern Washington (Daugherty 1956). To the extent that the artifacts occurring in this site were not what archaeologists were expecting on the basis of their knowledge of other early sites in North America, this find came as a surprise (Daugherty 1956:247; Swanson 1962:1). In particular, large stemmed projectile points were found rather than the fluted varieties such as Folsum and Clovis. Along with the points there were the remains of bison, smaller game and waterfowl. The location of this site (well away from the river valley) and the faunal remains which were interpreted as evidence for a hunting emphasis, contributed to a different picture of the subsistence base than was thought characteristic of the more recent aboriginal groups of the Plateau. One of the first dates assayed by the newly developed radiocarbon technique produced a date of 8,700±400 B.P. years. In the light of the post-glacial climatic and vegetational sequence that had been revealed in the studies of Hansen and Antevs (1947; 1948), the site was interpreted as evidence for an economy primarily based upon hunting in an environment that was more lush and richer in game than the modern environment of the region.

The combination of increasing awareness of post-glacial environmental change, the demonstrated antiquity of human occupation in the Plateau, and the appearance of an absolute dating technique (C-14) which all culminated with the excavations at Lind Coulee led to a rapid definition of a cultural sequence in the years that followed. Archaeologists, at this point, not only expected to find a long occupational sequence and one which involved change, but they also had a framework for anticipating the kind of evidence to look for. In particular, they began to look for changes in subsistence that would have arisen in response to post-glacial environmental change.

Earl H. Swanson's work in the Vantage region of the middle Columbia Valley during the years 1953-1954 was undertaken with the major objective of establishing a cultural sequence (Swanson 1962:2). As a part of this overall objective, he was concerned with determining a date for the initial appearance of the "historic Plateau pattern." Like many other archaeologists who preceded and followed him, Swanson did not view the ethnographically known adaptations as qualitatively distinctive from the preceding economies which lacked the horse. It was his intent to place "cultural events in geological context" (ibid.:4), and his strategy for accomplishing this was to employ Antevs' climatic scheme in the interpretation of sedimentary deposition at twelve sites in the Vantage ragion. Natural depositional units and the artifactual assemblages they contained were cross-correlated for this series of caves, rockshelters, and housepit sites. Although Swanson subsequently disclaimed his earlier belief in a direct equation of climatic and cultural change (Swanson 1962:82), he did concude that the appearance of

a diversified hunting economy and small winter housepit sites coincided with the end of the Antevs' postulated dry interval (3,500 B.P.). An important aspect of Swanson's chronology was that the shift to intensive fishing was placed quite late--after 1200 A.D.; it is at this time he recognized the emergence of the "ethnographic pattern." Swanson must be credited with the successful attainment of his main research goal--establishing a pioneer cultural sequence. With a time range of some 7,000-8,000 years, however, this sequence did not overlap with the earlier occupation at the Lind Coulee Site.

Another project being carried out at about the same time (1953-1956) by L. S. Cressman of the University of Oregon resulted in the sought after longer cultural sequence. This work took place at two sites on the Oregon side of the Long Narrows at the Dalles opposite from Wakemap Mound where Strong, Schenk, and Stewart met with limited success in their attempt to investigate the possibility of culture change almost three decades earlier. Cressman's project was most notable for defining <u>in a single site</u> a continuous sequence spanning virtually the entire post-glacial period. More will be said about this site in our discussion of early sites below.

By the early 1960s, the broad outline of a cultural sequence had emerged (Butler 1959; Daugherty 1962), and this framework has not been modified subsequently in any substantial way. Many regional chronologies have been reported in the intervening years (Butler 1959; Swanson 1962:41-50; Rice 1965; Warren 1968:17-21; Nelson 1969:8-93; Sanger 1970:111-112; Grabert 1968:149-154; Turnbull 1973:107-111; Chance

1977:151; Leonhardy and Rice 1970), but their contribution must be viewed as mainly the accumulation of increasingly detailed information about the spatial and temporal distribution of traits and trait complexes. The understanding of prehistoric settlement and subsistence already formulated by the early 1960s has not been modified or advanced in any major way. This stasis in the perception of prehistoric culture change is at least partially explainable as the result of continuity and persistence of a common theoretical approach. The normative and diffusionistic themes have been maintained along with the belief that climatic change has been a principle driving force behind culture change. Non-climatic environmental changes, such as catastrophic fluctuations in the availability of anadromous fish (see especially Sanger 1967; Brauner 1976:306-307), have also been proposed.

Like the perception of the cultural sequence, schemes of post-Pleistocene climatic change have not been revised in any dramatic way. Studies of sedimentation rates, faunal shifts, pollen frequencies, and glaciology at most, support a model of post-glacial climate involving greater regional variation than the original tripartite climatic sequence of Antevs and Hansen (1948; 1947). Studies of rockfall frequencies and suggested changes in sedimentation rates for a number of Northwest rockshelters (Fryxell and Daugherty 1963; Fryxell 1964) are interpreted as support for a warmer, drier interval in the mid post-Pleistocene. Independent studies of Alpine glaciation (Denton and Karlen 1973; Miller 1969) show documented advances from 5,800 to 4,900 B.P., 3,300 to 2,400 B.P., and the well-known neoglacial advance from the early sixteenth into the twentieth century sometimes called, "The

Little Ice Age." Recent work by Mack (1978), however, suggests a more complex post-glacial climate that leaves the Hansen notion of "Thermal Maximum" as equivocal or, at least, ambiguous given the ecological amplitude of the flora monitored in the curves. The upshot of paleoenvironmental research, in any case, seems generally to be that there has been substantial environmental change during the Holocene and that this change was somewhat more complex and less uniform in its geographical occurrence than was originally suggested.

Broad Spectrum Foraging

Beginning with the earliest well-documented evidence of human presence in the Plateau at around 11,000 B.P. and continuing for the next 7,000 or 8,000 years, is an interval of seemingly great adaptive stability. Lithic assemblage content along with the spatial and temporal distributions of recurrent tool forms have been the major areas of attention in much of what has been written about the earlier portion of the Plateau archaeological record. To the extent that most of these assemblages are comprised primarily by seemingly hunting related items--lanceolate points, burins, gravers, atlatl weights, and a wide variety of cutting and scraping tools--there seems to be remarkable uniformity over wide expanses and several millennia. In addition to these technological similarities, the early adaptations to the Plateau seem to have involved highly mobile and relatively small groups of people whose winter subsistence derived largely from the hunting of ungulates rather than stored foods. In a fundamental economic sense then, it is obvious that early adaptations throughout the worlds'

temperate zone appear to have shared these same basic properties (Cohen 1977). The concepts of a "Desert Culture" (Jennings 1956), an "Old Cordilleran Culture" (Butler 1958), and the "Intermontane Western Tradition" (Daugherty 1962) all draw attention to the homogeneity of archaeological manifestations over vast areas of Western North America.

The assemblages embraced by this long period are characterized by relatively simple tool inventories that are quite redundant from site to site except perhaps in their relative frequencies. If we were to exclude projectile point forms from consideration, the entire prehistoric sequence prior to 3,000 or 4,000 years ago in the Plateau is very difficult to partition geographically or temporally on any other basis. Current knowledge does not indicate any changes in settlement pattern (no patterns have yet been identified) and no major directional changes in subsistence have been demonstrated though there may be some evidence for minor trends of increasing exploitation of plants and fish. In the face of so much uniformity temporally and geographically, it is surprising that the pictures of subsistence that have been formulated by archaeologists are so divergent. A brief discussion of several of the better known sites will illustrate why a broad spectrum model of subsistence seems most consistent with the archaeological record. A number of sites were selected from the Southwestern Plateau to indicate the wide range of variation present even within quite limited geographic areas.

The Lind Coulee site in the Channeled Scablands of southeastern Washington is unusual among early sites that have been excavated in the

Plateau in that it is an open site that is located some distance from a river valley. A large assemblage of artifacts was found along with a faunal assemblage in which bison predominates (Daugherty 1956; Enbysk 1956:270). It was inferred that the site was occupied in early spring due to the presence of newborn and full-term fetal bison faunal remains (Irwin and Moody 19784:256). Radiocarbon age estimates on burned bones yielded a date of 8,700 ± 100 years B.P. Elk as well as small quantities of muskrat, beaver, and waterfowl remains were also recovered at the site but bison exceed all other species represented. The tool assemblage lacked items regarded to have functioned in plant processing, and the general picture of subsistence was that these people were hunters whose major food resource was bison (ibid.:259). Indeed, the harvesting of bison during the early spring along with bone points that were recovered (Daugherty 1956:Fig. 253) are characteristics associated with Folsom bison procurement strategies (Frison cited in Butler 1978:66; Frison and Zeimens 1980).

Another important early site that presents a vastly different picture of subsistence is Five-Mile Rapids which is located at the western edge of the Plateau just upstream from where the Columbia cuts through the Cascade Range and enters the coniferous forest. The site is situated at the head of a tremendously turbulent stretch of water (the Long Narrows) where the river virtually turned on its side in passing through deep and narrow basalt channels. As a natural salmon fishery, the vicinity is probably unsurpassed throughout the world. Excavations here revealed a deposit with cultural remains 7 meters in depth and spanning the last 10,000 years (Cressman 1960).

The lithics from this site are generally similar to those known from other early sites in the area--including a high frequency of large lanceolate points, burins, gravers, end-scrapers, and a number of girdled pebbles (bolas). In the absence of preserved faunal remains, activities at the site would ordinarily be identified as largely hunting related. The fauna, however, are particularly interesting because they provide another perspective. More than 125,000 salmon vertebrae were found in strata that were radiocarbon dated between 6,000 and 10,000 years in age. From the same deposits, large numbers of fish-eating birds were recovered including cormorant, condor, turkey vulture, bald eagle, gull, and several others. A wide variety of smaller mammals and considerable numbers of worked deer and elk antlers were also reported but bones of these larger mammals were infrequent. As a result of work at this site, Cressman challenged the prevailing image of early Plateau hunting adaptations by suggesting that salmon fishing was the primary component of subsistence and that hunting and collecting were secondary. Unless the faunal remains eventually prove to have a non-human agent involved in their deposition in the site[1], the evidence for fishing seems clear, and the association of such a wide variety of birds and mammals argues for a very broad-based economy in which few resources were ignored. While Cressman's evidence obviously challenges the big-game hunting viewpoint, his case for fishing as a primary component of subsistence and for a high degree of sedentism is premised largely upon the sheer quantities of salmon bones. More likely, this site can reasonably be imagined as one which was seasonally occupied during the summer when both salmon and the species which prey upon them or their spawned-out carcasses were plentiful.

The Hat Creek site is an open site on the Columbia River--roughly half way between Lind Coulee and Five-Mile Rapids. Although no radiocarbon dates were assayed on this material, a thick layer of Mazama ash which blanketed the deposits permits a confident upper limiting date of 6,700 B.P. A sizable collection of lithic and faunal material was recovered from deposits immediately underlying this ash. Although quantitative data on the fauna from this site have never been reported, it was Shiner's preliminary conclusion that "numerically speaking, rabbits were most frequently killed, then deer, followed by salmon" (1961:178). Even if we assume that deer would surpass rabbits on the basis of weight, it is clear that yet another view of subsistence could be formulated from the evidence at this site.

At the Goldendale site which is located in the grasslands of south-central Washington, still another subsistence emphasis is indicated (Warren et al. 1963). This small site is located in an area where camas is presently found and presumably would have been at times in the past. Excavation of this site produced no identifiable faunal remains even though a few bone artifacts were recovered. Interestingly, nearly 20 percent of the lithic items were ground stone and, of these, most were edge-ground cobbles or milling stones[2]. The archaeologists estimated the age of the site on the basis of typological criteria to be comparable in age to others that have been radiocarbon dated between 7,000 and 10,000 years B.P. Both the environmental setting of the site and its artifactual content suggest that the site was primarily a plant collecting camp.

The last site to be considered in this discussion of early subsistence in the southwest part of the Plateau is Marmes Rockshelter. The site is situated on the Palouse River about 1.5 miles upstream from its confluence with the Snake. Cultural deposits in the rockshelter range temporally from 10,750 ± 90 B.P. to historic. In the three strata beneath the 6,700 year old Mazama ash layer deer, antelope, and elk dominate the faunal assemblage. Rabbit, coyote, muskrat, marmot, and ground squirrel are also present in smaller numbers (Gustafson 1972). Riparian resources included large quantities of freshwater mussel, suckers, and chub but no salmon remains were identified (Rice 1972). Manos and milling stones are also reported (ibid.). Inferences about subsistence of the early occupants of Marmes were that the hunting of large mammals and gathering of freshwater mussels were the major economic activities (Rice 1972:214).

These sites nicely illustrate the problem of extrapolating subsistence from individual sites. Rather than imagining a number of focal exploitive systems as implied in "bison hunters" or "fishermen," it is more plausibly arguable that the diversity in food resources present in these sites is understandable as the product of broad-spectrum systems of resource utilization. Since each site probably represents an occupational episode of brief duration, the economic pursuits of that <u>season</u> take on higher visibility. The fact that all of these sites appear to be composed of deposits that were accumulated during many occupational episodes suggests the probability that a seasonally regimented sequence of sites were occupied through the year.

It is noteworthy that these four sites do not approach the variety of environmental settings present in their regions; all are at low elevation and most are located adjacent to major rivers. As yet, we are unaware of any regions or kinds of environmental settings in the Plateau where the sites of these early foragers have not been found with the possible exception of those heavily watered and forested areas of southeastern British Columbia (Turnbull 1973).

Due to a general absence of systematic research programs of combined regional survey and excavation and due to a well-known bias towards river valley and rockshelter sites, it is quite difficult to present either a coherent picture of the subsistence-settlement systems of individual regions or an adequate inter-regional comparison of the same. In a very general way, there are differing emphases in the species exploited in various regions of the Plateau. Bison, for example, appear to have played a much greater role in subsistence in the southeastern Plateau throughout the Holocene. There are frequent occurrences of assemblages with the classic High Plains point varieties--Clovis, Folsum, Scottsbluff, Eden, and Plainview (Gruhn 1961). Bison pounds have been reported as at the Wasden site (Butler 1978:67), and bison are the most abundant large mammals present in faunal assemblages from the long occupational sequences of Wilson Butte Cave in south-central Idaho (Gruhn 1961) and Bison Rockshelter in eastern Idaho (Swanson 1972).

In summary, it should be evident that the faunal remains present a more diverse picture of the early mobile-foraging adaptations than do

their associated lithic assemblages. The combination of simple and widely recurrent tool assemblages with quite variable faunal assemblages might be viewed as indication of the non-focal and opportunistic character of subsistence. Given the great variability in faunal remains shown here to be present within a recognizably biased sample of archaeological sites, it would be reasonable to conclude that a much greater range of variability would be found in a more representative and environmentally diversified sample of sites. Because sites have often been investigated as entities unto themselves and without context in a regional settlement pattern, there has been a frequent and probable misleading tendency to generalize the variability present in single sites to the regional level. In view of the degree of moblity and the very eclectic resource exploitative systems suggested here, it is unlikely that an adequate understanding of settlement and subsistence will emerge until more extensive regional studies have been undertaken.

Semisedentary Foraging

In a broad sense, the adaptations which we would prefer to call "semisedentary foraging systems" are not unique to the Plateau; they appear similar in their general organizational structure to other nonagricultural adaptations known from the ethnographic and archaeological records of many areas of the world and particularly from environments with marked seasonality in temperature. Such adaptations involved a degree of sedentism made possible by delayed consumption of stored foods during seasons of resource scarcity. The aboriginal peoples of the Northwest Coast are, of course, among the better known hunter-

gatherers with this form of adaptation in recent times. In the Plateau, semisedentary settlement systems are well documented for those aboriginal groups who were minimally effected by the introduction of the horse. These would include the Sanpoil-Nespelem (Ray 1933), the Shuswap (Teit 1909), the Thompson (Teit 1900), and several other groups that have been usually viewed as more "traditional" than their equestrian contemporaries in other parts of the Plateau (Ray 1939). Archaeological research in the Plateau reflects a long-standing interest in the cause for and antiquity of adaptations like those of these ethnographic peoples (Swanson 1962; Warren 1968; Nelson 1969; Brauner 1976; Browman and Munsell 1969).

The emergence of semisedentism in the Plateau is marked by a number of approximately contemporaneous and seemingly correlated changes in the organization of subsistence and settlement. Associated with the increased degree of sedentism, there appears to be a general shift from winter hunting to food storage as the primary over-wintering strategy. A consequence of this shift is that storeable resources, in this case fish and plants, contribute a significantly greater proportion of the total diet; winter hunting assumes a supplementary role in subsistence. Locations of winter settlement become focal points in a settlement system that is much more centralized and hierarchical due to a general shift from residential mobility to logistic moblity as the primary means for linking consumers with food resources (Binford 1980). In other words, resource exploitation involves a greater degree of resource transport by specialized task groups rather than actual movements of an entire local group to the procurement sites. Despite the continuities

in specific items of material culture and resource inventory that are present throughout much of the cultural sequence of the Plateau (Caldwell 1956; Daugherty 1962; Daugherty et al. 1967:107; and Grabert 1968:152), the initial appearance of semisedentism represents a quantum change in the organization of settlement and subsistence. It is for this reason that the transition to semisedentary land use based upon food storage is recognized here as the first major evolutionary change in adaptation that can be recognized in a long cultural sequence. This transition was, in our opinion, at least as profound as that associated with the shift from hunting and gathering to agriculture in other archaeological sequences.

The appearance of housepits, evidence for increased dependence upon fishing, facilities for storage of food, cemeteries, increased diversity in artifact assemblages, and increased intersite variability are among the more prominent material correlates of the beginnings of semisedentism in the Plateau. Although the time of initial occurrence of most may be variable in different regions, they seem to appear between 2,500 and 4,500 B.P. in nearly all riverine areas. Housepits have been employed as "diagnostic" indicators of the origin of what has been variously referred to as the "ethnographic pattern" (Swanson 1962:81), the "Plateau pattern" (Warren 1968:81), and the "winter village pattern" (Nelson 1973). Because housepits are also the features most often excavated and dated, their spatio-temporal distributions are somewhat better known than some of the other presumed material correlates of semisedentism.

The earliest dated housepits have been reported from the northern or Canadian Plateau and in the more easterly portion of the southern Plateau. In the Canadian portion of the plateau early housepits are known from the Cayuse Creek site (3,265 ± 180 B.P., Turnbull 1973:30), the Tezli site (3,850 ± 140 B.P., Donahue 1975:29), and Punchaw Village (4,500 B.P., Helmer 1977:66). In the southeastern Plateau, housepits with early dates are known from the Hatwai site (4,340 ± 90 B.P., Ames and Marshall 1979), and Timothy's Village (4,060 ± 130 B.P., Brauner 1976:152). Sites with early housepits in various regions of the Lower Snake and Middle Columbia include Three Springs Bar (2,760 ± 240 B.P., Daugherty et al. 1967), 45OK78 (2,700 B.P., Grabert 1966), Umatilla (2,420 ± 120 B.P., Cole 1966), and the Lower Blalock Island site (2,980 ± 80, Cole 1968).

From their initial appearance and throughout all subsequent periods, housepit sites are, with few exceptions, located along the floodplains of the major drainages and their principal tributaries. Preferred locations for these and other riverine sites lacking structural remains are at the mouths of tributary streams, canyon mouths, alluvial fans, river islands, floodplain areas adjacent to river channel constrictions, and occasionally lakes. At a broader geographic scale, housepit sites as well as many lacking house structures seem to be conditioned in their location by the availability of good places to fish (Osborne 1957:8), and in different areas of the Plateau it has been noted that housepits are distributed up to but not beyond the upstream limits of anadromous fish spawning (Turnbull 1973:144; Morris Uebelacker, personal communication). Housepit sites appear to have been

the hubs of the settlement systems, and their central role has been emphasized in what are sometimes called "site complexes" (Nelson and Rice 1969:95). In archaeological terms, the site complex amounts to a spatially clustered group of sites usually located within a radius of a kilometer or less of one another along the river floodplain. Sites frequently occurring within these complexes would include, in addition to housepit clusters, open sites lacking evidence of structural remains, storage facilities in nearby rockshelters and talus slopes, cemeteries, and sometimes permanent fishing facilities such as "fish walls" (Nelson and Rice 1969:95). All of these sites and facilities are presumed to have functioned within an interrelated settlement system.

Housepit sites are distinguished by the presence of circular or subrectangular depressions that range from 3 m to as much as 20 m in diameter. Sites containing these features are enormously variable within and between regions in terms of their size, internal structure, and content to the extent that this variability can only be touched upon here.

The number of surface depressions occurring at individual sites varies from 1 to nearly 200 or more and site areas vary accordingly. There is some evidence to suggest that earlier housepit sites tend to contain only one or a few houses that could have been occupied contemporaneously (Swanson 1962:83; Grabert 1968:151; Grabert 1971; Leonhardy and Rice 1971), whereas later sites are more variable and sometimes contain large numbers of housepits. In sites with long sequences, an increase in number of houses through time is often

indicated (cf. Butler 1960). Exceptionally large sites such as Miller Island with 132 depressions (Strong et al. 1930), 45BN53 with 183 (Osborne 1957:4), and Strawberry Island Village with 133 (Cleveland et al. 1977) are apparently all relatively late sites that date within the last 1,500 years. In addition to the possibility of a temporal gradient in village size, it might be pointed out that housepit sites in the Upper Columbia and the upper portion of the Lower Snake seem to be smaller on the average and less frequent than those from the Middle Columbia (Grabert 1968:Table 1; Turnbull 1973).

Storage facilities are frequently identified in housepit sites. These are usually small (.5-3 m in diameter) pits excavated into the sediments of house floors or areas adjacent to houses. In the Canadian Plateau, these pits are frequently bark-lined and often have salmon vertebrae in association (see Sanger 1970:Figure 10). In at least one site that we are aware of (Umatilla, Rice 1971), a shift from earlier houses with storage pits in their floors to later houses with pits in adjacent inter-house areas has been noted. The archaeological evidence for storage practices has received so little attention that little more can be said about temporal and geographic patterning in these facilities though they are likely to exist and would be of considerable value to understanding subsistence.

Faunal assemblages have been systematically studied and reported for only a few sites. In general, large mammalian remains are usually present in quantities that would indicate their limited and supplementary role in the winter diet (Brauner 1976:294). Given the

marked environmental variations within the Plateau, it is not surprising that the relative proportions of deer, elk, antelope, and bison remains are quite variable geographically. Along a gradient of increasing precipitation and elevation from the mouth of the Snake to an area near the Washington-Idaho border, the relative frequency of deer and elk in late prehistoric housepit faunal assemblages increases while antelope decrease (Carl Gustafson, personal communication). Strawberrry Island near the dry end of this gradient has yielded a faunal assemblage in which antelope constitute 87%, and deer 13%, of the identifiable elements of large ungulates (Cleveland et al. 1977; Olson, personal communication). Near the other end of this gradient, the Alpowa locality has produced a large faunal assemblage in which deer constitute 72%, bison 14.3%, elk 5.7%, mountain sheep 4.2%, and antelope only 4% (Lyman 1976). Similar variations from region to region may be expected when systematic faunal studies are reported for more areas of the Plateau. It might also be added that some temporally distributed changes in large faunal utilization are suggested for the Lower Snake. Bison (and possibly elk) appear to have higher frequencies in earlier housepit sites (Kenaston 1966:80-81; Schroedl 1973:48). We suggest that some of the detectable differences in faunal assemblages from sites dating to the last 2,000 years are also related to climatic shifts that are only beginning to be recognized.

In turning the discussion to non-housepit sites, we are faced with a disappointing lack of information. The reasons for the scarcity of such information cannot, however, be attributed entirely to the obvious reservoir bias of most previous archaeology in the Plateau. The

point here is that while open sites without structural remains in riverine settings constitute more than 80% of all sites documented during reservoir surveys (cf. Nelson and Rice 1969; Nelson 1965; Grabert 1968; Helmer 1977), systematic and intensive excavations have almost always been diverted to that minority of riverine sites that are old, deeply stratified, rich in artifact density, or contain the remains of houses. The long standing avoidance of these "other" sites implies perhaps as much about their content as do the few test pits that have been casually dug into them. Being unable to describe the results of any thorough investigations of such sites, we will only mention some of the characterisitcs in an impressionistic way. These riverine sites lacking structural remains are sometimes referred to as "campsites" and often have concentrations of freshwater mussel remains, quantities of fire-cracked rock, hearths, "earth ovens," and sometimes storage pits. Plant processing tools, along with items presumable related to fishing, typically seem to occur in relatively higher frequency than in housepit sites. Since the absence of diagnostic artifacts is an oft-cited reason for their abandonment by archaeologists after testing, it is possible that such sites may have relatively low frequencies of projectile points as well. Many of these sites probably were occupied during the spring, summer, or fall when both fishing and plant collecting would have been the dominant food procurement activities.

Archaeological investigations in upland or inter-fluvial settings have largely been initiated during the past decade, and the results of much of this work are not yet widely available. In general the archaeological evidence appears to corroborates the central role of

the riverine sites in the settlement systems. Interfluve sites include numerous open sites that are small, generally unstratified, and characterized by low density concentrations of lithics. They also include rockshelters, stone alignments, cairns, and probable caching facilities (Greene 1975; Smith 1977). Although interfluve sites show a great deal of inter-site variability, individual sites tend to reflect a relatively narrow range of activities (Dancey 1973). Beyond pointing out that these sites support the view that they were seasonally occupied by small groups seeking specific plant and animal resources, we would only add that there is presently little indication of change in patterns of upland utilization after the initiation of winter sedentism.

Equestrian Foragers

Studies by Wissler (1914:24) and Haines (1938:435-436) indicate that horses spread onto the Plateau from the Shoshone of southern Idaho early in the eighteenth century. This marked the beginning of a brief pattern of equestrian life that shaped much of what we know of the ethnographic period (Ray 1939; Spinden 1908; Anastasio 1955; Walker 1967).

The environmental limitations of horse production and the relative need for mobility enhancement are variables that condition equestrian hunter-gatherer adaptations in the Plateau or elsewhere. As Osborn (1979) has aptly demonstrated, the distribution and number of horses in western North America is limited by winter forage, and horse numbers tend to decrease as winter severity increases. Using Osborn's common sense model, it is no surprise to find the Sahaptin Nez Perce of

the southern Plateau rich in horses while some of the more northerly Salish groups remain horse poor, up to the present. But this is a possibilist approach; the problem of a selective context for increasing group mobility looms large. In general, two broadly different subsistence strategies involving hunting mark the shift in Plateau adaptations during this brief equestrian interval:

(1) Increased fall/winter reliance on hunting extending from the Great Columbia Plain at its center into the surrounding foothills. As was true for the Snake River Plain, groups foraged in maximum dispersion with winter sedentism at upland hunting areas in proximity to otherwise scarce fuel supplies. This is the pattern recorded by Meriwether Lewis (Hosmer, II:149-151, 249). Elk, antelope, deer, and the few remaining bison were the target species.

(2) The massing of relatively large numbers of horsemen (including women) and movement in a coordinated manner to the western margins of the Great Plains, often in multilingual "hordes" or "bands" to systematically pursue bison, sometimes for periods greater than one yearly cycle. Almost always returning, this group "out-migration" has been considered a "pressure release valve" for a locally stressed adaptation on the Plateau itself (Bruce Rigsby, personal communication).

Thus far we have proposed a 3-stage sequence of adaptations involving an early big game and a broad spectrum use of other resources followed by increasing dependence on anadromous fishes and root crops (semi-sedentary systems) succeeded lastly by an increasing dependence on hunting with equestrian mobility. This simple model must not be construed as invariable across the landscape of the North American Plateau. The equestrian pattern, like the preceding adaptive systems, is highly variable and some groups remained essentially pedestrian and/or riverine oriented. The development of a truly regional pattern linked the root specialists (cf. Marshall 1977), the salmon specialists (e.g., Wasco-Wishram Spier and Sapir 1930; Colville Chance 1973) and the equestrian hunters. While this suite of resources formed the staple diet of most Plateau foragers, the variation in each was marked, and as Walker (1967) has emphasized, the cross-utilization of these resource patches was enhanced during the equestrian interlude. These general shifts seen in the ethnohistoric data contrast strongly with the long period of semi-sedentary life evidenced by the archaeological record of the preceding 3-4 millenia. The key here is, of course, in the horse and its expansion of human foraging range.

Several correlates to this range expansion are integral. Whereas critical prey densities (Frison 1973; Reher 1978; Osborn 1979) for pedestrian hunters must remain relatively high, equestrians can opt for hunting strategies well beyond the pedestrian's wildest expectations and can profitably pursue game species in lower density. It is our speculation that during the brief equestrian interval, the remaining herd mammals, elk, antelope, and bison on the Snake River Plain, became

locally extinct due to the increased killing efficiency of equestrians. For example, late prehistoric sites show an abundance of antelope (Osborne 1957; Cleveland et al. 1977) while at the time of major European contact, no antelope are reported. Buechner (1953) mentions an early report of mounted Columbia Basin horsemen driving antelope into snowdrifts and slaughtering them wholesale, while Lewis (Thwaites 1959) mentions antelope hunting on the Columbia's plain. For certain, the bison, the wapiti, and the antelope were unimportant to the local Plateau economy by the 1850s. Decreased pursuit time with increased bulk transport and a lessening of general hunting costs contributed to the local demise of these species. The reception of guns, especially the fusils of the early Northwest Company trade type and, eventually, more efficient weaponry increased the kill ratio.

The well-known equestrians of the Plateau, for the most part the more southerly groups (e.g., Nez Perce, Cayuse, Umatilla, Yakima, Palus, Walla Walla) used large tracts of land suitable for overwintering horses. As a limiting factor on horse production, these groups controlled much of the Columbia Basin's winter range. While herd mammals, namely the bison, elk, and antelope were probably below a critical prey density early on, horses and eventually cattle became critical resource species. Haines (1955) argues that some of the northern groups, such as the Spokan and Sanpoils (Salish) relied upon the Nez Perce for yearly replacement of horses lost to predation and cold. Horses became a well managed yearly crop for the Nez Perce (probably Cayuse also) who are purported to have traded up to 6% of their yearly crop to other Plateau groups (Haines 1955:77). The heavy

reliance of the Lewis and Clark expedition on Nez Perce horses for food as well as transport in this area is a matter of fact.

With the exception of the Columbia and the Spokan, the Salish groups of the northern Plateau were relatively horse poor (Ray 1933). Combined with a paucity of protected winter forage areas, the Salish of the northern Plateau became involved to a greater degree with the fur trade. The establishment of Spokan House by David Thompson in 1810 marked a period of intense trapping that left much of the northern Plateau under British influence (Chance 1973). The necessity for a dispersed upland trapping strategy combined with poor range partially accounts for the lack of equestrian development here, although the participation of some of these groups in the Plains bison expeditions is recorded (cf. Anastasio 1972).

As F C. Leonhardy pointed out many years ago (personal communication) concerning the Lower Snake drainage, settlement shifts, changing house form, and the decreased use of older villages exacerbate the search for archaeological pattern during this interval. Grabert (1968:5) seems to concur with the report of Post (Cline et al. 1938:11) that a more dispersed settlement pattern accompanied horse mobility and winter hunting among the Okanogan. Salvage archaeology with its river basin emphasis in the Northwest is another factor possibly contributing to the low archaeological visibility of the equestrian adaptations. Mobile house forms such as the above ground lodge (Ray 1933) and the plains-like tipi leave less visible evidence than the excavated housepit of the semi-sedentary village. Perhaps the dispersed and brief

occupation of upland hunting camps, as predicted for the major mammalian resources, has not allowed the pattern recognition that housepit villages seem to enjoy.

Occupations linked to equestrians are rare. Leonhardy (Leonhardy et al. 1971) has identified a small component with horse bones at Wexpusnime, Rattle Snake Village, on the Lower Snake River. Sprague (1967), in the excavation of the burial yard associated with the major Palus Villge at the mouth of the Palouse River, disinterred horse bones.

The discussion of Spier and Sapir (1930:224-228) of the southern Plateau trading economy remains the best description of the regional pattern in the literature. The Wishram village of Nixlu'idix, now Spedis, Washington, translates as "trading place." This location at the Long Narrows of the Columbia typifies the destructive effects of modern land-use that have impacted the greater and lesser "emporia" of the equestrian period, leaving little archaeological evidence. These trade centers were almost always associated with major fishing stations, but few have been explored archaeologically. Locations at the mouths of the Snake, Grand Ronde, Okanogan, Kettle Rivers, and at Spokane Falls to name the larger ones, remain archaeologically unknown. These were loci of major historically known equestrian camps. Early photographs of large encampments at the mouth of the Umatilla River display a "camp circle" pattern of plains-like tipis, with no visible evidence of stones to have left rings (Schalk 1980). Tipi rings have been identified at the head of Rock Creek in eastern Oregon (Jesse Winchester, personal

communication) in Umatilla country (Ray 1939:385) and are known from the East Fork of the Salmon River in Idaho (Butler 1978:73).

Two settlement structures, the camp circle, often quite large and the small local group settlement characterize this period. Ross (1849:117) writes of "3000 souls, or more" camped at the head of the Narrows during early August of 1811. The bison grouping of the Plateau used the camp circle with groups maintaining their relative geographic position. This was a defensive posture used on the Plain's encampments and probably rarely on the Plateau proper. Small equestrian sites, rarely encountered archaeologically, mark the proposed shift in settlement on the Plateau. Their location was constrained to areas where winter graze was available in hunting areas and represent a pattern of dispersal that left some winter villages on the major rivers unoccupied.

Discussion

In presenting a very simplified 3-stage sequence of major adaptive systems, we have attempted to identify the most fundamental evolutionary changes that are reflected in the archaeological record of the entire Plateau. This scheme would be badly misunderstood if it is not recognized as having been imposed upon a sequence with long-term trends and processes that tend to be distorted in any stage model. It would also be misunderstood if it were interpreted as suggesting complete uniformity in the sequence from region to region. In fact, equestrian adaptations did not develop in the more northerly areas of the Plateau. Similarly, semi-sedentary adaptations based heavily upon

fishing could not have developed in those areas upstream from the limits of fish migration. Yet another distortion that should be recognized is that we have minimized that finer-grained adaptive variability at the scale of individual regions in the effort to characterize a very large and diverse area.

The purpose of focusing upon the broad, area-wide uniformities in adaptations has been to make more comprehensible those basic patterns which seem to underly the numerous regional chronologies that have been formulated. Regional chronologies, constructed with differing criteria and almost invariably phrased in a burgeoning abundance of phase names, are not conducive to comparison, communication, or synthesis at a larger scale. Whether by accident or design, the individualism expressed by the creators of these chronologies has resulted in such a formidable body of provincial terminology that life-long researchers in the Plateau are unable to get a glimpse of "the forest for the trees." If definition of temporally distributed patterns in the archaeological record leads to the development of research problems directed towards the explanation of culture change, then it must begin by documenting the general processes that are common to large geographic areas.

Given the present lack of understanding of inter-regional variability in environments, there is no ecological context for understanding archaeological variability manifested at the scale of individual regions. It may be anticipated that increasing attention to the structure of environments within and between regions in future research will offer a powerful explanatory framework for approaching adaptive diversity at either scale.

Archaeology, like all science, involves a repetitive cycle of data collection, synthesis, dissonance between theory and fact, followed by theoretical advance. Plateau archaeology in 1980 is emerging from two decades of intensive data collection. It may reasonably be assumed that the massive amount of archaeology conducted in the 1970s will offer a great deal of new information when the results of this work have been synthesized and made widely available. On the other hand, theoretical advance will undoubtedly require the identification of new variables for which previous observations and data collection will be inadequate.

NOTES

1. There are several qualities about this site, its unusual hydrological setting, and the very peculiar faunal assemblage reported for it that warrant future investigation. In view of the suspiciously high proportion of scavengers in the faunal assemblage, the distinctive depositional conditions Cressman documents, and the anomalously abundant salmonid remains, there is reason to ask whether there might be a substantial nonhuman agency involved. This site appears to have characteristics of a paleontological deposit that was also occupied periodically by humans.

2. According to Robert Mierendorf (personal communication), oak (Quercus garryana) is a significant component of the vegetation surrounding the Goldendale site today. This fact may also be pertinent to functional interpretations of this site and the abundant ground stone tools it has produced.

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CHAPTER III

PREVIOUS ARCHAEOLOGY IN THE LOWER MONUMENTAL RESERVOIR REGION

by

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The first archaeological work in the Lower Palouse River region of the Lower Snake was apparently that of the Smithsonian River Basin Survey staff (Osborne 1948).[1] Ten archaeological sites were reported from this survey of the proposed 27.5 mile long Lower Monumental Reservoir. It hardly requires mention but the SRBS archaeological surveys identified fewer sites in most reservoirs than did later surveys in the same areas. Lower Monumental was not systematically surveyed again prior to the flooding of the pool in 1969. In the following years, excavations were concentrated primarily in the vicinity of the Palouse River Confluence. All of this work subsequent to the SRBS survey was performed by Washington State University under the general supervision of Dr. Richard Daugherty and reported largely in graduate student theses. We will briefly list and describe the sites which have been excavated and reported in the Lower Palouse/Lower Monumental Reservoir area. Locations of most of these sites are shown in Fig. 4.

Palouse Village (45FR36)

The site is situated on the west side of the mouth of the Palouse River and was occupied by Palouse Indians up to the 1940s. In 1962, it was scheduled for intensive excavation but test pits lead to the conclusion that the deposits were badly disturbed--probably by construction of the adjacent railroad bed (Fryxell and Daugherty 1962). Attention was, therefore, redirected to Marmes Rockshelter. The only subsequent work at

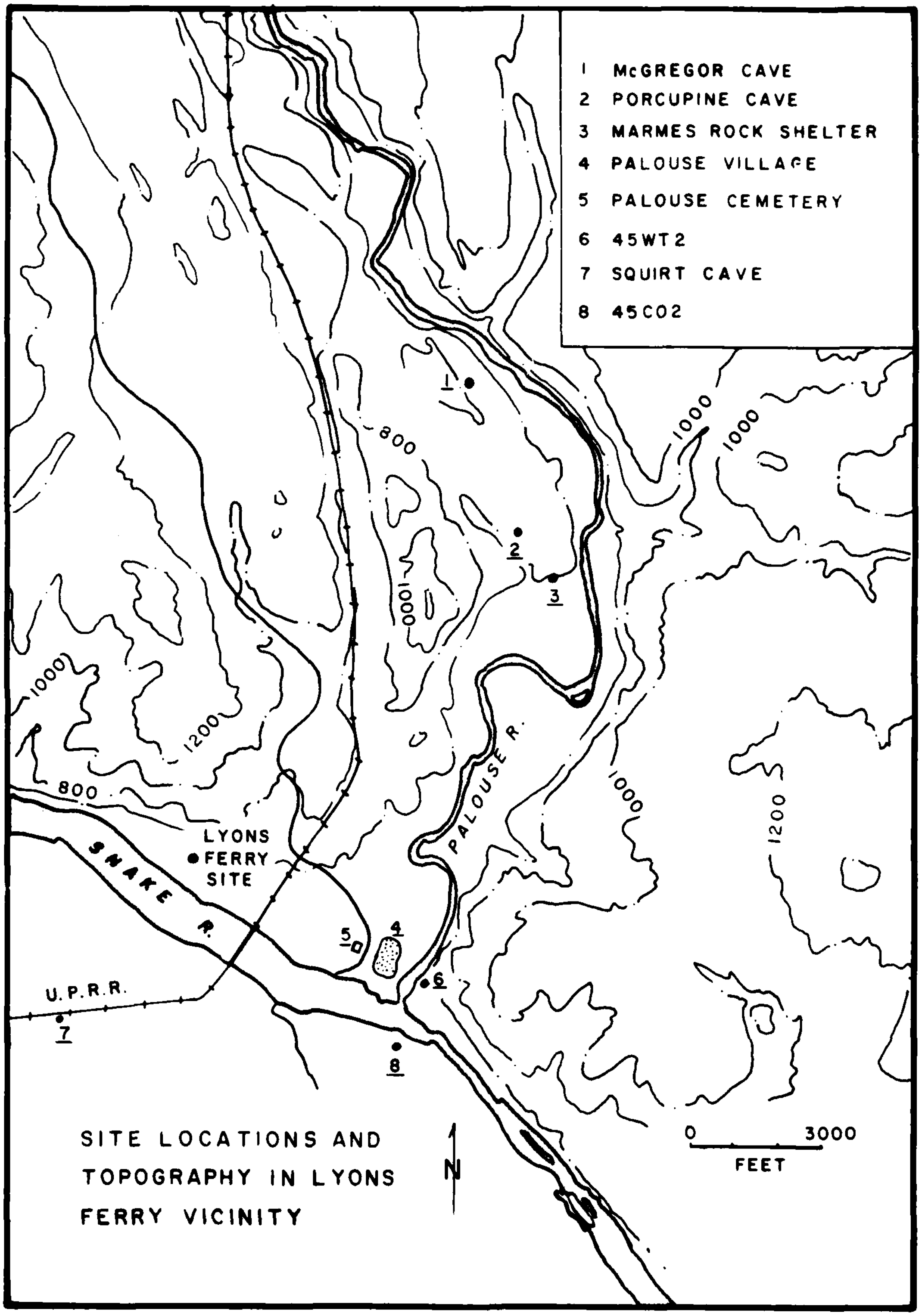
1 McGREGOR CAVE
2 PORCUPINE CAVE
3 MARMES ROCK SHELTER
4 PALOUSE VILLAGE
5 PALOUSE CEMETERY
6 45WT2
7 SQUIRT CAVE
8 45CO2
800
1000
1200
PALOUSE R.
SNAKE R.
LYONS FERRY SITE
U.P.R.R.
SITE LOCATIONS AND TOPOGRAPHY IN LYONS FERRY VICINITY
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Figure 4.

Palouse Village beyond the series of test pits, was done by David Rice and members of the MCAS in the summer of 1968 (Rice 1968). From this limited excavation, Rice suggested the site deposits were all late prehistoric (less than 2,000 years old). A few hearth areas, a possible housepit depression, and some historic artifacts in the upper part of the deposits are the only bits of information available on what was found in this site.

A total of 251 historic burials were removed from the Palus Indian cemetery adjacent to the Palouse Village during the summer of 1964. This excavation was directed and reported by Roderick Sprague (1965; 1967). Descriptive information on sex, orientation, and burial furniture is given. Studies of skeletal remains (Birkby 1966; Redford 1969) and historic artifacts (Pullen 1970; Weatherford 1971; Fenstermaker 1976; and Fielder 1979) have also been reported.

McGregor and Porcupine Caves (45FR201, 45FR202)

These two large caves were partially excavated in the summer of 1953 by Daugherty and later reported by Mallory (1966). Both were unusual sites in that they contained well-preserved cordage and matting in abundance as well as a number of wooden items. The caves were interpreted as having been used only for caching due to the presence of numerous depressions across the floor surfaces and the general absence of faunal and lithic debris or hearths. Mallory (1966:64) concluded that most or all of the deposits in both caves were probably more recent than A.D. 1750. The caves must have housed the permanent cache pits that were most likely filled with dried fish. If Mallory's estimates for the age of these distinctive cave storage facilities is accurate and generally valid for the region, then they apparently represent some kind of caching strategy employed by equestrian groups.

Squirt Cave (45WW25)

Located 300 feet above the Snake River and almost opposite the hatchery project area, is Squirt Cave. Like McGregor and Porcupine Caves, this small cave seems to have served a rather specialized function relating to storage or caching of food resources (Combes 1969). Eight grass, mat, or stone-lined storage pits were encountered and, again, quantities of textiles and other perishable artifacts were recovered. The remains in this rockshelter were assigned to the last 2,000 years.

Marmes Rockshelter

Located about a mile and a half up the Palouse River from its mouth, Marmes Rockshelter constitutes the most intensively excavated site in the region. The deposits of the site extended from the rockshelter down onto the flood plain. A long occupational sequence began at around 10,000 B.P. and the deposits contained numerous burials and hearths (Fryxell and Daugherty 1962; Fryxell et al. 1968). The earliest lithic assemblages from the rockshelter have been described in a comparative study of archaeological materials ("Windust") pre-dating Cascade assemblages (Rice 1972). Faunal remains have also been analyzed and reported for the stratigraphically least complex portions of the deposits or about a third of the total number of faunal items recovered (Gustafson 1972). The upper strata in the rockshelter, as at McGregor, Porcupine, and Squirt caves, was riddled with numerous pits and presumably this shelter served as a caching location in recent times too. The lower strata--those below Mazama ash (6,700 B.P.) were not mixed by pit-digging and the shelter was apparently being used during that interval as a seasonal camp (Rice 1972).

45WT2

This site is situated at the mouth of the Palouse--on the east side and opposite the Palouse Village site. One portion of this site contained protohistoric burials which had been disturbed by relic collectors (Perry 1939) and another area of the site had been disturbed by railroad construction (Nance 1966). Nonetheless, a stratified sequence of deposits was identified in two areas of the site. The varieties of artifacts found above and below Mazama ash indicated the intermittent occupation of the site over a period of 8,000 years. All materials above Mazama ash and prior to about 1,300 B.P. had been eroded and deposited in a lag concentrate. In the upper foot of sediments, trade items were encountered. Excavations were limited to 5' x 5' test pits and trenches.

45CO2

This is a third site located at the confluence of the Palouse and Snake; it lies on the south bank of the Snake opposite the mouth of the Palouse. A surface distribution of archaeological remains at this site was examined and a single test pit was excavated (Nelson 1965). Almost all sediments had been eroded long ago to form a surficial lag concentrate and no further work was done at the site.

The Tucannon Site (45CO1)

This site is located at the mouth of the Tucannon River and was first tested in 1964 (Nelson 1965). Two test pits revealed deeply stratified and artifact-rich deposits and the site was, therefore, tested more extensively the following year (Nelson 1966). Cultural material was found over an area of 250,000 m^2 and to a depth of 4 meters; age estimates

based upon lithic typology indicated an occupation span of at least 6,000 years (Nelson 1965; 1966). The sequence of assemblages identified at this site included Cold Springs material (4-6,500 B.P.), a later assemblage containing corner-notched projectile points with expanding stems and estimated to be between 2,000 and 4,000 years old, followed by a late prehistoric assemblage. The intermediate assemblage from this site is the source of Leonhardy and Rice's "Tucannon Phase" (Leonhardy and Rice 1970) and purportedly represents an interval of time for which few archaeological sites are known from the Lower Snake. It is possible that pithouses and storage pits were present at the site (Nelson 1965:21) though none were visible on the surface. Talus burials were present above the site (Osborne 1948), but most had been looted by grave robbers (Iverson 1977).

Three Springs Bar (45FR39)

This site is a multi-component site located about 6 miles above Lower Monumental Dam. Of the 9 superimposed occupational levels identified at this site, the lower 5 lacked structural remains (Daugherty et al. 1967). The presence of leaf-shaped points in the lower occupations suggested an initial Cascade occupation. Overlying these earlier components were a number of housepits, one of which was estimated to be nearly 2,800 years old by radiocarbon dating. This is the earliest dated structure in the Lower Monumental, Ice Harbor, or Little Goose Reservoirs and may be indicative of the approximate antiquity of winter sedentism in this region. Remains of three other more recent housepits including one with a protohistoric occupation were also excavated. Faunal remains, though recovered, were not analyzed or reported for this site.

The Harder Site (45FR40)

Approximately 5 miles further down the Snake from Three Springs Bar is another pithouse site which has been partially excavated (Kenaston 1966). The Harder site contained the remains of 24 surficially visible housepits and, of these, 2 adjacent ones were excavated almost completely. A single date from one house floor gave an age estimate of 1,525 B.P. and there was stratigraphic evidence for the presence on the site of earlier houses than those excavated. Only 32 faunal items were identified in the report (Kenaston 1966:80) and it must be assumed that this was a partial analysis. Interestingly, bison and elk dominate the mammalian remains in this tiny faunal assemblage.

The Cow Creek Rockshelter (45AD2)

This is a small rockshelter located on a tributary of the Palouse River (Cow Creek) which drains an extensive area of the channeled scablands. This site represents the only site that lies outside of the river canyon bottom that has been excavated and reported in the Palouse region; fortunately, a thorough description of the faunal remains from the site is available (Deaver and Greene 1978). Occupation in the shelter spans the last 3,000 years. Interestingly, the frequency of small mammals (ground squirrels, marmots, badgers) was higher in the lower levels whereas deer and pronghorn were more abundant in the upper levels. This led to the conclusion that a shift from individualized hunting to communal hunting was evidenced.

In summary, there is published information available on excavations of 11 aboriginal archaeological sites in the Lower Monumental Reservoir plus another site on a tributary of the Palouse in the channeled scablands. Fully 5 of these sites are rockshelters and, of these, 3 are special purpose or food-caching sites. Another 6 sites are open sites and 3 of these have associated burials. While substantial sediment blocks were excavated at Harder, Three Springs Bar, and Marmes Rockshelter, most site excavations were limited to test pitting or trenching. There has been no sizable excavation in any open riverine site lacking structural remains, and we are aware of only the one non-riverine site (Cow Creek) that has been excavated in the region. Faunal remains have been identified and reported for only 4 sites: 45WT2 (Gustafson 1972:98), Marmes Rockshelter (Gustafson 1972), Harder (Kenaston 1966), and Cow Creek (Deaver and Greene 1978). Vague information on the faunal remains from the Tucannon site is available (Nelson 1965:24). When it is recalled that 45WT2, Tucannon, and Marmes were all stratified sites with quite long occupational histories, it becomes apparent that faunal assemblages pertaining to discrete intervals of time must be extremely small. The picture which emerges with respect to faunal remains is that Marmes and Cow Creek rockshelters are probably the only sites in the reservoir or within a much larger surrounding region for which there are reported faunal assemblages that could be considered useful for questions pertaining to general subsistence change or settlement systems. To date, no inter-site comparisons of fauna have been undertaken and there have been no discussions of settlement systems.

I have drawn attention to some major information deficiencies to provide a context for evaluating the significance of archaeological resources that still exist in the region. Hopefully, identification

of such deficiencies will assist in establishing priorities for future research and management of the region's cultural resources.

NOTES

1. It is possible that some archaeological work had been done in the Lower Monumental Reservoir prior to the River Basin Survey of the late 1940s. Osborn mentions that Joseph Birdsell provided the River Basin Survey his notes from 1941 and 1942 which "aided materially in the location and evaluation of both paleontologic and archaeologic sites" (1948:8).

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CHAPTER IV

THE HISTORIC BACKGROUND OF THE JOSO BRIDGE CONSTRUCTION CAMP

By Roderick Sprague

Introduction

The proposed construction of a fish hatchery on the Pleistocene bar downriver from the confluence of the Palouse and Snake rivers by the U.S. Army Corps of Engineers has necessitated cultural resource investigations of the area. Under subcontract with Washington State University I have conducted a review of the literature, a search of area archives, and interviews with knowledgeable informants.

The area in question is very rich in history and because of the multi-faceted nature of the district it has been necessary to research the literature in archives not only under Joso Trestle but also its many names, such as Snake River Bridge, Snake River Viaduct, Union Pacific High Trestle, Joso Bridge, and the Palouse Area Trestle. It was also necessary to research under such topics as Lyons Ferry, Palus Village, Palus Indians, Mullan Trail, Perry, and Perry Post Office. All of these are cultural features of the area that, in many cases, provide photographic or written descriptions of the bridge in addition to the main subject. Often times pictures of Lyons Ferry in operation will show the trestle in the background; as is also true of pictures of Palus Village or Palus Indians.

Archives investigated for this project include the Oregon Historical Society, Washington Historical Society, Eastern Washington Historical Society, University of Idaho, University of Washington, Washington State University, Central Washington University, Eastern Washington University, Gonzaga University, Whitman College, Yakima Valley Regional Library, Spokane City Library,

Multnomah County Library, Walla Walla City Library, Pacific Northwest Indian Center, Museum of Science and Industry (Seattle), and County Courthouse records in Columbia (Dayton), Franklin (Pasco), Walla Walla (Walla Walla), and Whitman (Colfax) counties. Personal interviews were conducted with Ruth Turner, former operator of Lyons Ferry; Louise Jaussaud, former resident of the area; Robert Beal, Pomeroy; Gladys F. Fletcher, Dayton; Wilma Fletcher, Starbuck, as well as telephone interviews with Walter Oberst, Pasco, Washington; George Skorney, Public Relations, Union Pacific Railroad, Portland, Oregon; John Witherbee, Public Relations, Union Pacific Railroad, Omaha, Nebraska; William McKenzie, Public Relations, Burlington Northern, St. Paul, Minnesota; Arvid Grant, Olympia, Washington; Chicago Historical Society Archive; and the Museum of History and Technology, Chicago.

Extensive information was also kindly provided by Jeanne Welch of the Washington State Office of Archaeology and Historical Preservation. Judy Thayer of Walla Walla conducted extensive archival searching in Walla Walla and kindly made all her data available for this report. Mr. Lawrence Dodd of the Whitman College Library Archive was extremely generous of his time to both Mrs. Thayer and me. Linda Sprague kindly provided her files on Snake River steamboat navigation.

Photographs were kindly provided by Ruth Turner and Robert Beal. Jill Rockwell of the Yakima Valley Regional Library provided generous help in obtaining photographs from the Relander Collection at that Library. Walter L. Romberg of the Morrison-Knudsen Co., Boise provided extensive photographs and notes on the 1967-68 modifications of the bridge.

Randall F. Schalk and Gregory C. Cleveland provided help and encouragement in the field inspection of the site and also generously fed and housed me while in the field. LeRoy V. Allen, Army Corps of Engineers, Walla Walla, assisted in numerous ways both in the field and in Walla Walla.

Historical Background of the Region

The basic source for assembling these many historical references comes from my doctoral dissertation (Sprague 1967), a work dealing with the burial practices observed in the burial site 45FR36B removed in the summer of 1964 by Washington State University under contract to the Walla Walla District Corps of Engineers. Rather than utilizing a narrative approach this background will present a series of dates with brief comments.

1805 13 October, Lewis and Clark expedition passed by the mouth of the Palouse River observing a "picketed" graveyard and planks on scaffolds (Thwaites 1904-05 3:111-112).

1811 7 August, David Thompson camped while traveling to the Spokane country; also in the party was Ross Cox (Elliott 1914a:121, 1917:261-262; Tyrrell 1916:527; Irving 1836 3:191; Cox 1831:150-152).

1812 30 May, on the return trip the fur trader Clarke hanged a Palus Indian as punishment for theft of a silver goblet (Cox 1831:202-206; Ross 1849:210).

1825 3 July, John Work observed Palus Village (Elliott 1914b:89).

1826 19 July, Work in the company of David Douglas noted the site again (Elliott 1909:297; Douglas 1904:357-358).

1829 Jedediah Smith went through the area (Speck 1954:357).

1830 6 May, once more John Work observed Palus Village (Elliott 1909:297).

1833 Fur trade Francis Ermatinger describes the area (McDonald 1980:166).

1835 Missionary Samuel Parker (1840:284) travelled through the area.

1838 Missionaries Walker and Eells bought potatoes and salmon at Palus Village (Walker 1938).

1839 Missionaries Spalding and Whitman visited the area looking for a location for a possible mission site (Drury 1958:257).

1841 Charles Wilkes, linguist and explorer, traveled from Whitman Mission to Fort Colvile by the site (Wilkes 1856 4:466).

1845 Catholic missionary Pierre Jean de Smet (1905 2:455-456) described the area.

1847 4 April, Thomas Lowe (1847) crossed the river at Palus Village. The artist Paul Kane (1925) described the area as well as Palus Falls. Another artist, John Mix Stanley, also described and sketched the area (Stevens 1860:151).

1848 8 June, a large party of Americans including 60 men of the Oregon Volunteers under Maj. Magone plus the Walker and Eells families "crossed Snake River at noon in Poluse canoes" (Rambler 1848).

1852 Maj. John Owen (1927:55) describes the area in his journals.

1853 Washington Territory established with Isaac I. Stevens as governor. Lt. Rufus Sexton was met by a group of Palus warriors on the Columbia County side (Stevens 1860:108).

1854 George Gibbs, early ethnologist working on the Railroad Survey, described a Lewis and Clark medal at Palus Village (Stevens 1854:432). Lt. Grover (1855) of the same party described Palus Village and the cemetery. Walla Walla County created.

1856 In March, the area was described as strangely deserted by Col. Thomas R. Cornelius (1856).

1857 Maj. John Owen (1927:180) again described the area.

1858 Ft. Taylor was established at the mouth of Tucannon River in August in connection with the defeat of Col. Steptoe. In September of the same year Col. George Wright and his forces moved out against the Northern Tribes crossing at the mouth of the Palouse River. On 30 September Wright was back again in Palus Village and from there

returned to Fort Walla Walla (Burns 1947; Dunn 1886:284-309; Keyes 1884:266-282; Kip 1859; Manring 1912). W. T. Hamilton (1900) trader in the area, crossed in September making no mention of the recent battle while Father de Smet, also crossing in 1858, was quite concerned about the recent events (de Smet 1905 2:745).

1859 4 June, Capt. John Mullan arrived at the mouth of Palouse River with an escort of 100 men in the initial establishment of the Mullan wagon road (Anonymous 1859). The earlier crossing of the road may have been above the Palouse Rapids. Also in 1859 Edward Massey began operation of the Palouse Ferry. Relander (1956:101) states, without any referenced source, that the territorial legislature granted ferry rights to Edward L. Massey in 1858. Thomas B. Beall (1917:86) mentions that a ferry had been established at this time. Spokane County created.

1861 In a letter dated 5 April, Mullan (1861:550) states that he was using the mouth of the Palouse as a shipping point between Walla Walla and the Coeur d'Alene Mission. In a later letter dated 20 June he mentions sending "back the greater portion of my wagon train under an escort to Pelouse Landing, on the Snake River" (Mullan 1861:556). The 1861 literature contains two different reports by steamboat travelers concerning operations at the mouth of the Palouse River. Henry Miller (1960:17) on the steamer Okanagan said, "a mile below the rapids [Palouse] is a ferry on the road from Walla Walla to Colville. There is a small house at this point, which, with a house above the mouth of Umatilla, makes the only houses, except Old Fort Walla Walla that we have seen in 180 miles." Lulu Crandrall (1916:129), the first woman to describe the area, was travelling on the steamer Col. Wright, also in the year 1861. She said "at Palouse an enterprising person had

strung a rope ferry and passage of the boat was barred by the wire cable which swung barely above the current above the middle of the river, far too low to pass under."

1862 Justis Steinberger (1897:1154) ordered the establishment of a temporary depot at the mouth of Palouse to "facilitate the setting forward to Fort Colville troops and supplies." He also reported that the ferry boat had been carried away by high water. He made the same statement that Maj. James F. Curtis (1862) also made that the shortest route was to take supplies from Fort Walla Walla by steamboat to the mouth of Palouse and then by pack train to Fort Colville. Also in 1862 Charles Rumley, traveling from St. Louis to Portland reported on 9 October that he crossed the ferry kept by a man by the name of Sam Caldwell (Howard 1962:?41), more likely the Texas Ferry.

1864 William McWhirk was operating Palouse Ferry (McGregor 1971:27) and also began to survey for a town (McGregor 1971:36). Spokane County absorbed by Stevens County.

1865 Camels are reported to have been utilized on the Mullan road about this time (Lewis 1928:279; Howard 1934:196). Steamboats from Portland were landing at Palouse.

1866 Daniel Lyons takes over the operation of the ferry.

1871 Whitman County created out of Stevens County.

1873 George Hunter established Grange City at the mouth of the Tucannon River (Gilbert 1882:416; Hunter 1887:287).

1875 Columbia County created out of Walla Walla County.

1879 The first recorded U.S. Government Survey was conducted in this year by Sewall Traux (1879).

1881 The post office of Perry was established on the Columbia County side of the river by Daniel Lyons in August (Anonymous 1906:378).

1883 Franklin County created out of Whitman County.

1886 Big Thunder died at Palus (Hunter 1887:377).

1893 Daniel Lyons died, however apparently the ferry was continued under the ownership of his wife, Olive Lyons, for a number of years with various managers.

1889 Washington granted statehood. The Oregon Railroad & Navigation Co. finished the Snake River Valley Railway on the Columbia County side of the river (Lewis 1912:195) thus ending the need for Grange City and also probably destroying all the evidence of Fort Taylor.

1906 The consolidation of the Oregon Railroad & Navigation Company, the Oregon & Washington Railway, and the North Coast Railroad into the Oregon-Washington Railroad & Navigation Company. This new combination of Harriman owned lines in the Pacific Northwest was the company that was shortly to begin construction of the Joso Bridge. Also this year the Spokane, Portland and Seattle Railway Company began construction on the Snake River Branch from Snake River Junction to Riparia. The track was apparently laid by 1908. In 1909 the Spokane, Portland and Seattle Railway Company sold the line to the Clearwater Short Line Railway Company which in turn was absorbed by the Northern Pacific Railway Company in 1914 (W. A. McKenzie, personal communication 1980).

1909 The Snake River Branch of the Northern Pacific was constructed through the area below the soon to be constructed Joso Bridge. Also the section house (station) at Perry was constructed (Bill McKenzie, personal communication).

1910 The depot (section house) at Perry was constructed. It was 32 x 40 feet, of frame construction, and on a block and post foundation. Stratton and Lindeman (1976:56) give this as the date for the start of the Joso Bridge, however the authority of their work is greatly diminished by an absence of scholarly citations.

1911 The popular date for the beginning of construction on the Joso Bridge.

1912 The first date firmly established for the beginning of construction on the Joso Bridge by the Union Pacific Company.

1914 On 15 September Joso Bridge and the complete Spokane-Ayer Line was open to traffic.

1916 The Lyons' interest in the Palouse Ferry came to an end. Old Bones died and was buried in the Palus burial site.

1921 Informant Louise Jaussaud was married to Louis Jaussaud and moved onto the Jaussaud ranch a few miles from the mouth of the Palouse.

1923 Starbuck was no longer a division point on the railroad and began to decline in importance.

1927 The post office of Perry was closed (Anonymous 1927:1152). W. E. Sprout was the manager of the ferry (Ruth Turner, personal communication).

1928 W. J. "Doc" Cummings took over as ferry owner and renamed the Palouse Ferry, Lyons Ferry (Ruth Turner, personal communication). Sprague (1967) lists 1926 as the date for this change in ownership.

1940 Helen Fisher, wife of Sam Fisher, died and was the last individual to be buried in the Palus cemetery. The same year Nae G. and Ruth Turner took over ownership of Lyons Ferry.

1948 The River Basin Surveys recorded Palus Village as site 45FR36 but missed the historic burial site and made no mention of the construction camp site (Osborne 1948:10).

1951 On 3 June the Palus Falls State Park was dedicated.

1953 An archaeological survey was conducted by Richard D. Daugherty and five students, a project in which I was involved.

1954 Pete Bones, an occasional resident at Palus Village died in Dayton, Washington on 13 August.

1960 The centennial celebration of Lyons Ferry was held on 5 June. Also in this year a Pacific Gas Transmission Company, Alberta to California Pipe Line survey was conducted which again failed to mention any of the historic sites (Mallory 1961).

1961 The Palus Burial site was utilized as a testing area for both resistivity probing and seismographic techniques as applied to archaeological searching for burials (Chatters and Crosby 1962; Crosby and Chatters 1962). Also in this year Washington State University began excavations at the village site of Palus Village (45FR36).

1963 The village (45WT2) across the Palouse River was excavated by Washington State University (Nance 1966). Also testing was conducted by Richard Daugherty at the Palus burial site (45FR36B).

1964 The Palus burial site was excavated by Washington State University (Sprague 1965, 1967). Several studies of historic artifact classes have evolved out of the type collection (ca. 1830-1890) recovered from this site (Pullen 1970; Weatherford 1980; Fenstermaker 1976; Fielder 1979). Historic artifacts were also reported from associated sites during the same summer (Sprague and Birkby 1969).

1965 The Northern Pacific tracks of the Snake River Branch were abandoned.

1968 Additional excavations were undertaken at the Palus Village site (45FR36) by the Mid-Columbia Archaeological Society (Rice 1968:11-12). This year also saw the completion of the modification of the piers on the Joso Bridge by the Morrison-Knudson Company (Anonymous 1967, 1968). Also completed this year was the new highway bridge that made Lyons Ferry obsolete. This bridge, which formerly crossed the Columbia River at Central Ferry, was disassembled and laid out in the area below the Joso Bridge until it was utilized. The last run of Lyons ferry was on the evening of 20 December.

1969 Lower Monumental Dam was completed and the area flooded.

1971 Lyons Ferry State Park dedicated.

1978 The survey of the fish hatchery project area was conducted by Washington State University (Wesson 1978).

1980 Work was begun on the prehistoric and historic survey and historic research reported in this work.

Joso Bridge and Related Construction Camp

The Joso Bridge was probably begun in 1911 or possibly 1912 by the North Coast Railroad. It was finished in 1914 by the Oregon-Washington Railroad & Navigation Company, a division of the Union Pacific Railroad. The bridge was a portion of a new line between Spokane, Washington, and Portland, Oregon, that reduced the distance by 51 miles and also considerable time because of a reduction in grades and curves (Anonymous 1912, 1915).

An article in the Railway Age Gazette (Anonymous 1915) describes the physical characteristics of the trestle.

> The bridge across the Snake river is notable on account of its length, height and the problems involved in its construction. The structure is 3,920 ft. long and includes a viaduct approach 510 ft. long on end and 2,040 ft. on the other, the tower spans being 30 and 40 ft., and the intermediate spans varying from 60 to 80 ft. The river channel spans proper consist of five riveted truss spans varying from 206 ft. to 246 ft. in length, supported on steel towers. Each post of the towers supporting the truss spans is carried on an individual concrete pedestal, the height of the highest towers being 221 ft. above the masonry.

The article continued in similar vane with specific engineering information.

A document from the Washington State Office of Archaeology and Historic Preservation dated May 1980 identifies Kelly-Atkinson Construction Company as the contractor of the superstructure of the bridge. This is verified by a note on a photograph from R. A. Fife. The same document also lists the Missouri Valley Bridge and Iron Company as contractor for the substructure. Also listed is Caughen, Bointin and Company which is probably Caughran, Boynton & Company of Spokane, the contractor for the concrete on the project (Anonymous 1912:1192). Contact with the Chicago Historical Society and the Museum of Science and Technology in Chicago did not reveal any further information on the Kelly-Atkinson Construction Company of Chicago. The home office of the Missouri Valley Bridge and Iron Company has yet to be determined.

Informants have been somewhat useful in attempting to better understand the function of the bridge construction camp, however, the time gap (66 years) is fast becoming critical. During the summer of 1964 I interviewed R. A. Fife of Santa Barbara, California, the timekeeper on the project in 1913 and 1914. Mr. Fife took many pictures of the construction and the camp which he made freely available before his death a few years ago. Some of these have been published in Relander and copies are in the possession of Ruth Turner, Robert Beal, and me. Virtually all of the information I was able to obtain from Mr. Fife in 1964 is duplicated in letters and on the back of pictures; information which will be expanded in the discussion of the photographic evidence.

On 11 July 1980, I interviewed Louise (Mrs. Louis) Jaussaud, in Walla Walla. Mrs. Jaussaud informed me that her father-in-law, Leon Francois Joseph Constantine Jaussaud, born in France and immigrated to Franklin County, was the supplier of beef (and probably mutton since sheep raising was his speciality) to the construction camp mess hall. Mrs. Jaussaud also agreed with the supposition that Joso as a name for the bridge, and the section house at the east end of the trestle, is an anglicized corruption of Jaussaud.

Mrs. Jaussaud came to the area in 1921 as a bride of Louis but recalls many stories she heard about the construction of the trestle. One of importance concerns the use of Blacks ("Negros") for diving; in which, according to her husband, they "lost one a day." While this is undoubtedly an exaggeration it is certainly not an unusual attitude toward Blacks at that time. Mrs. Jaussaud also indicated that when she arrived there were no buildings remaining under the bridge, a fact possibly disputed by some photographic evidence.

All other interviews conducted in connection with this project have been directed at establishing specific dates of other events and did not involve first or second hand experience with the trestle. There is a wealth of folklore in the region concerning the bridge including one that no laborers were housed at the construction camp, a statement contrary to evidence presented by R. A. Fife, the only first hand informant with whom I have spoken.

The photographic evidence will be presented in chronological order with the photographs shown in Figures 5-12.

5. The best known and most useful picture shows at least 21 structures, including privies, all situated downriver of the trestle and inland from the Northern Pacific Railroad. It is dated on my copy by R. A. Fife as 1913-14 and labeled "Construction Camp, Snake River High Bridge, Lyons Ferry, Washington." A copy of the same photograph in the possession of Ruth Turner is labeled 1914. A letter to the Turners as well as my own recollection of an interview with R. A. Fife indicates that the building in the lower right corner was Fife's own residence. Those to the left were occupied by foremen, and the superintendant. I further recall Fife indicating that one of the large buildings in the center was a barracks and one was a mess hall, however, I do not recall which building was which.

6. The second picture, also originating with R. A. Fife and currently in the possession of Ruth Turner, shows the actual construction of the trestle. It was also published in Anonymous (1915:624). These two sources of the same photograph compliment each other because the one sent to Mrs. Turner by Fife was torn out of a photo album and has portions missing as well as areas obscured by cellaphane tape. The published version is very grainy, almost newspaper quality print, and does not provide as good detail as the Fife original. The view is from the Columbia County side looking southeast. It

is dated on the Fife copy as 1914 and it is on the back of this print where there is also an indication of Kelly-Atkinson Construction Company as the contractor. This photograph combined with the previous photograph presents us with a continum of the whole of the Franklin County side of the river. In the far left of this picture is the same structure that Fife identifies as his living quarters in the previous picture. Upriver from the trestle are at least four additional structures approximately the same size as other living quarters.

7. The third photograph is also from Anonymous (1915:625) showing the trestle under construction and showing a building and privy probably just barely visible in the Fife copy of the previous picture to the left of the far-left damaged spot. In other words, in the previous Fife picture, most of the evidence for this structure has been torn away in the removal of the picture from the album. No date is given for this picture, however it is undoubtedly 1914.

8. This picture and the next one are both from Mrs. Turner and are Fife pictures that he did not make available to me. This one from 1914 shows most clearly the four large structures upriver from the bridge. It is taken from the Columbia County side looking northeast.

9. Taken slightly later in 1914 than the previous picture, this one give additional perspective to the downriver camp area. It also shows very clearly a structure (and privy?) between the Norther Pacific tracks and the river. Stratton and Lindeman (1976:56) give Union Pacific as a source for this photo.

10. The next photograph to be used is also from Anoymous (1915:623). It shows rather indistinctly, through the trestle work, the upriver structures. It also shows a structure on the Columbia County side situated downriver of the bridge on the first terrace. Since the bridge is completed and date of the publication is 1915, the photograph must date 1914 or 1915.

Fig. 5. Joso Bridge construction camp, 1914. Photo by R. A. Fife.

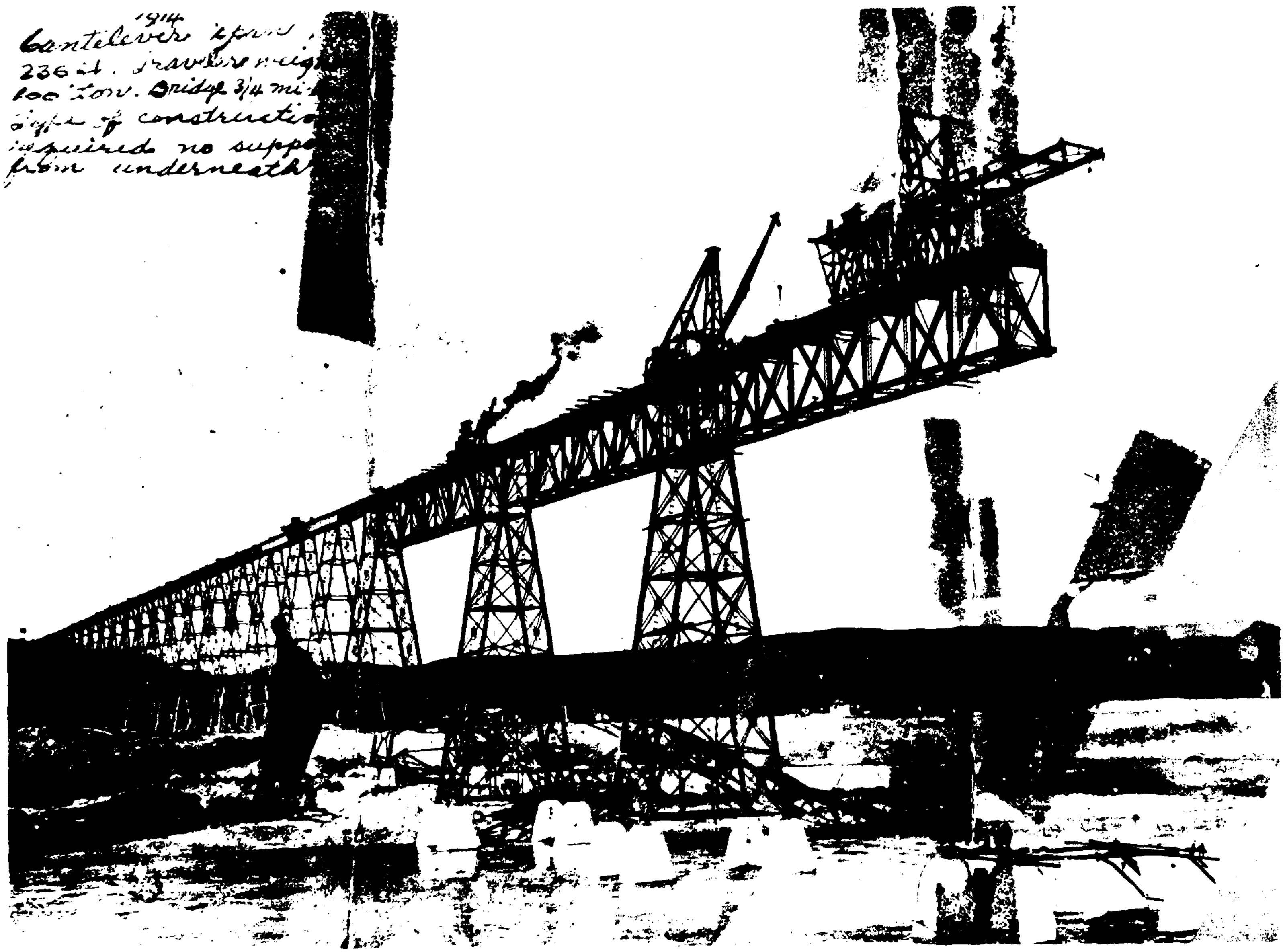

Fig. 6. Joso Bridge, 1914. Photo from and probably by R. A. Fife. Courtesy of Ruth Turner.

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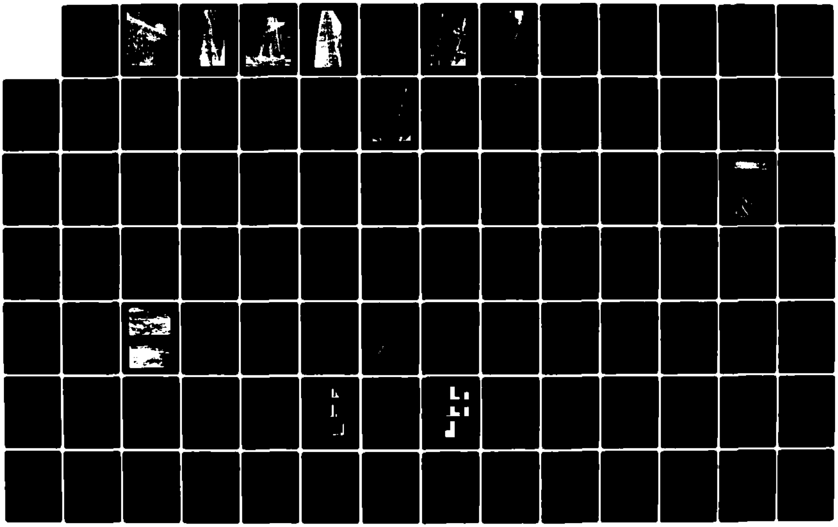

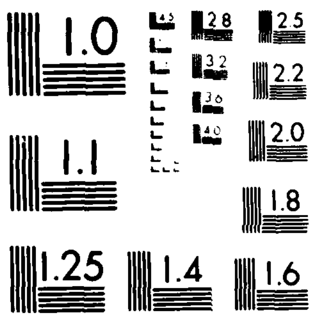

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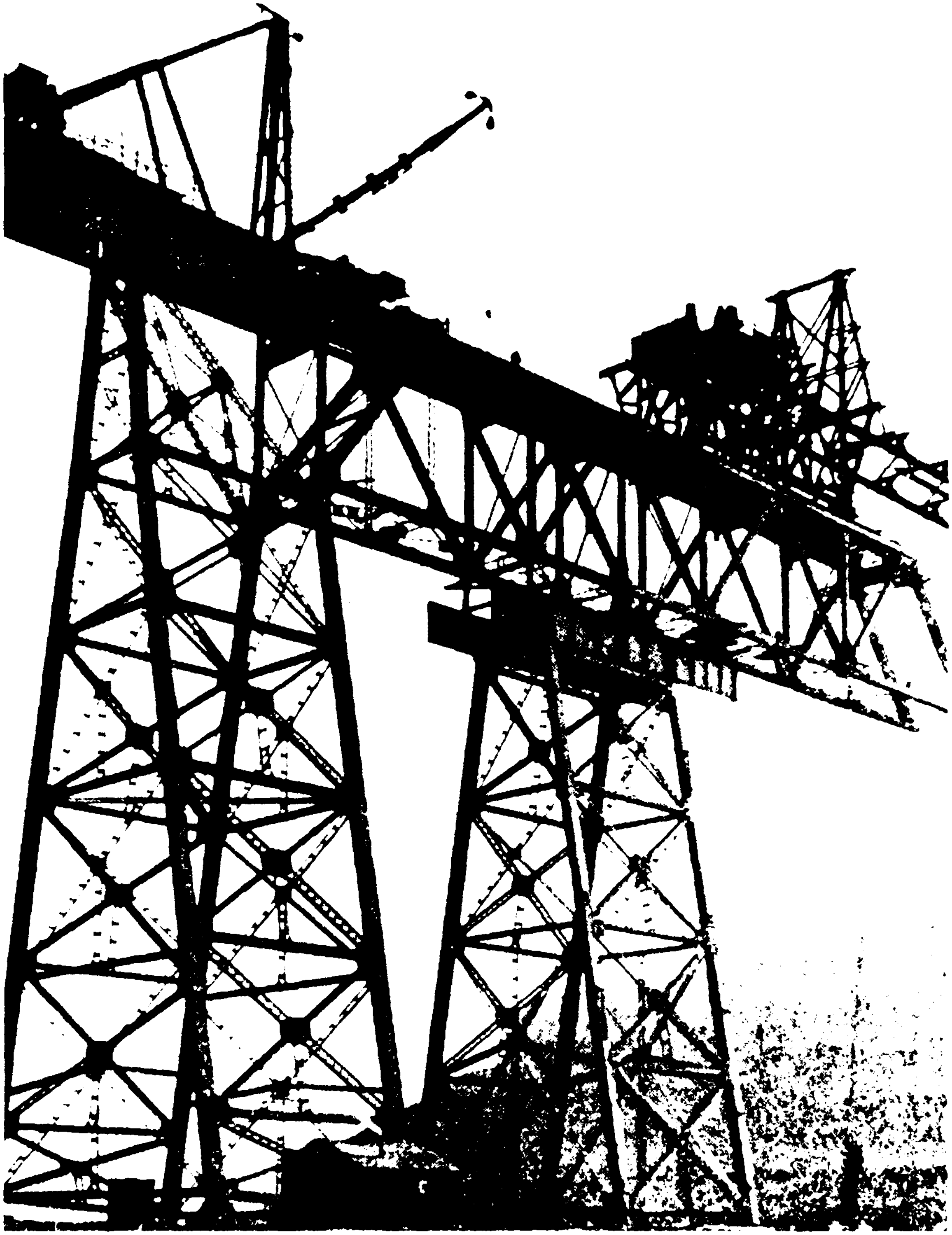

Fig. 7. Joso Bridge, 1914. From *Railway Age Gazette* (Anonymous 1915:625).

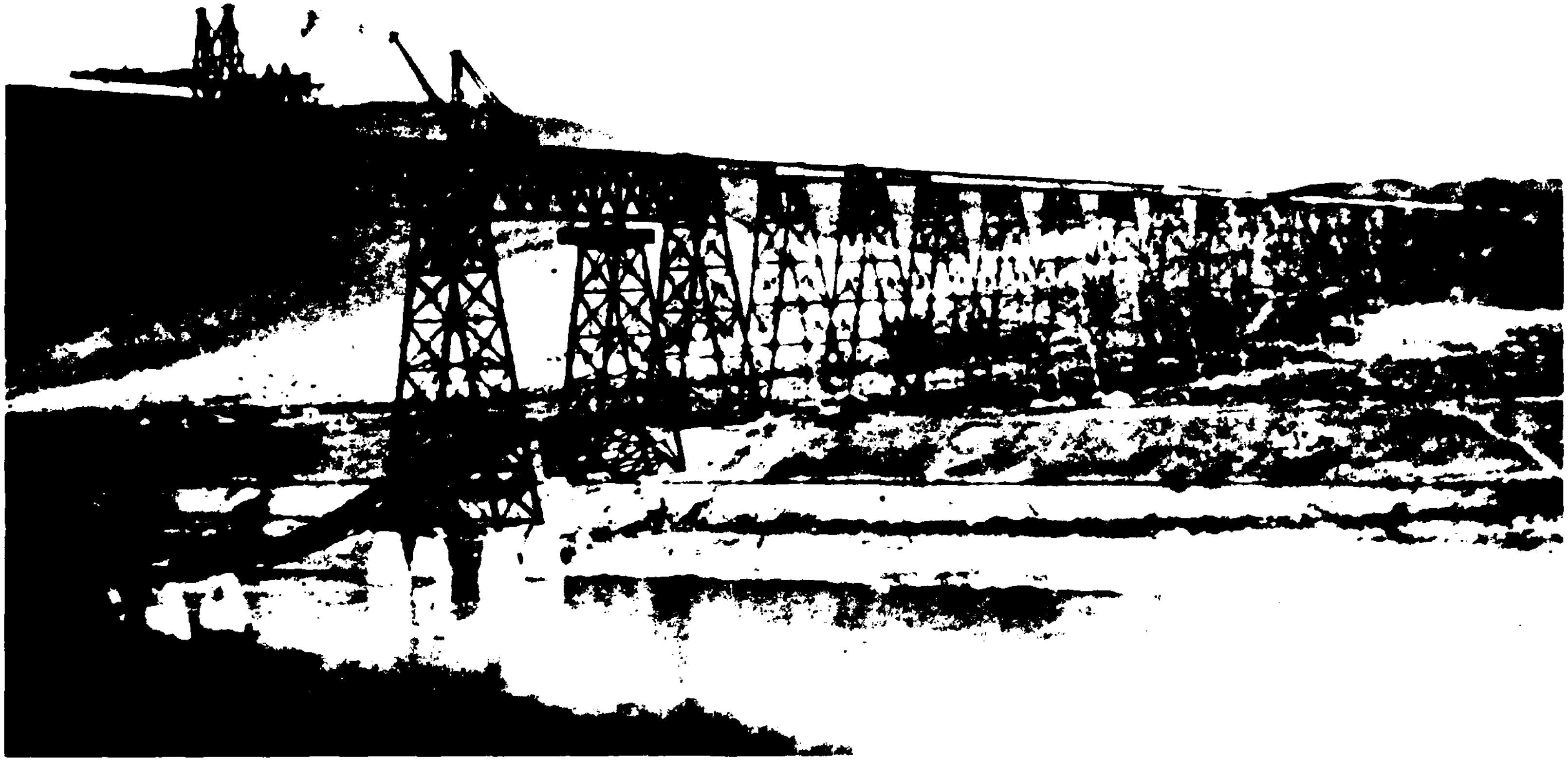

Fig. 8. Joso Bridge, 1914. Photo from Ruth Turner, perhaps taken by R. A. Fife.

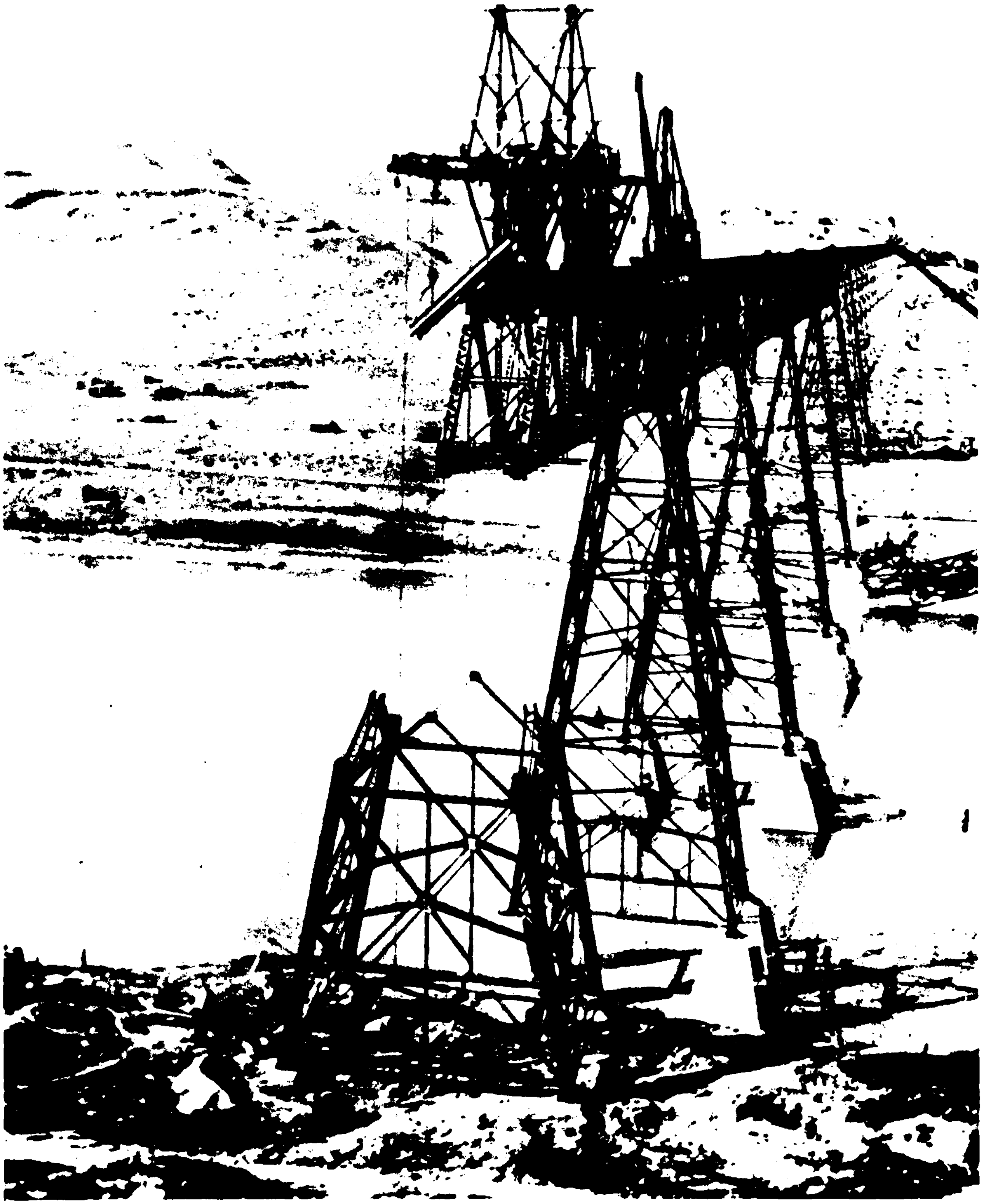

Fig. 9. Joso Bridge, 1914. Photo from Ruth Turner, perhaps taken by R. A. Fife.

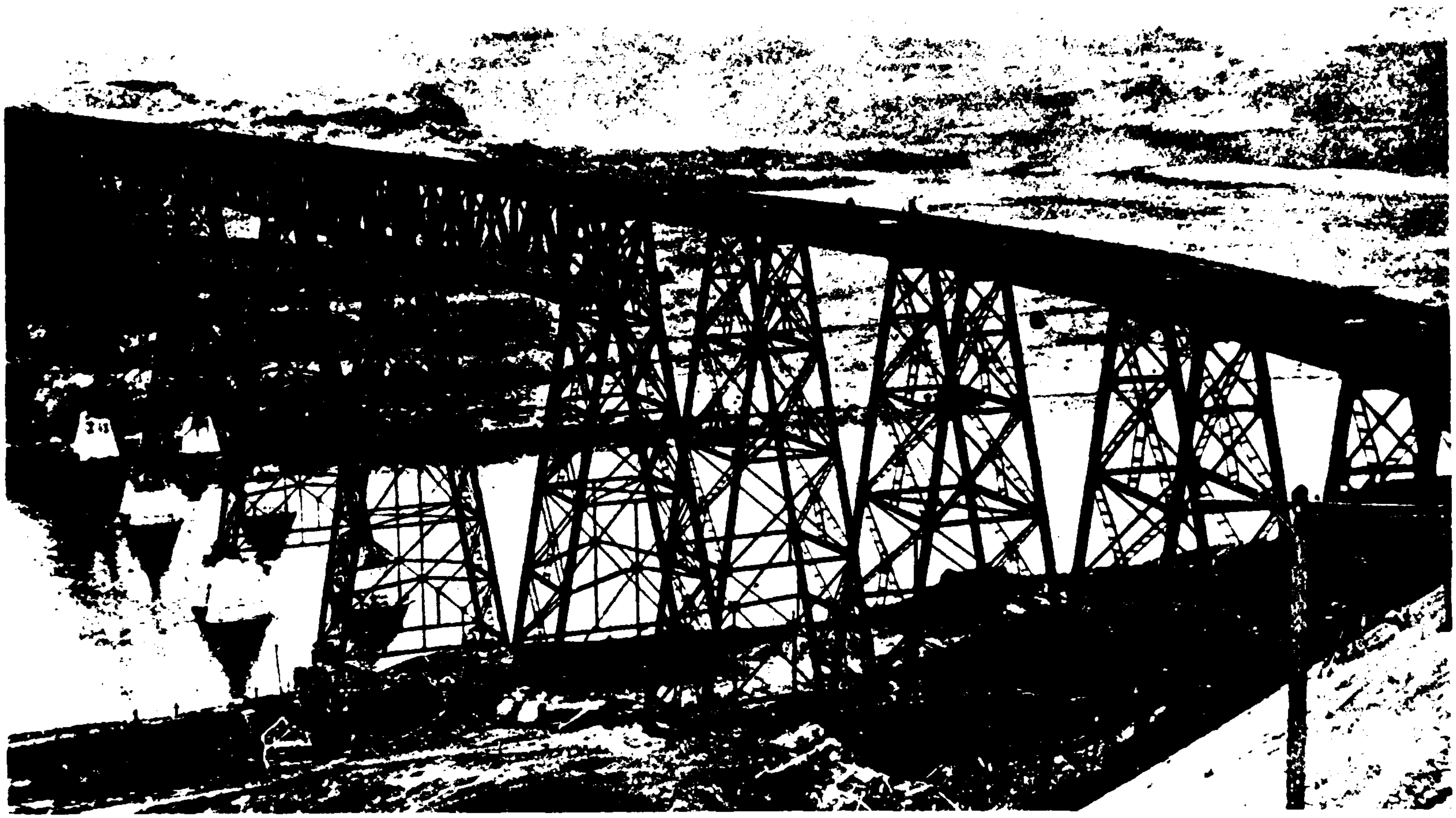

Fig. 10. Joso Bridge, 1914. From *Railway Age Gazette* (Anonymous 1915:623).

11. The seventh picture is taken from just above the ferry landing on the Columbia County side in October of 1918 looking in a northeasterly direction. Three possible structures are very poorly delineated downstream of the bridge on the Franklin County side. It is suggested that these are probably more likely associated with the Northern Pacific Railway rather than the bridge construction camp.

12. The eighth and final picture of importance in determining the fate of the construction camp as well as the secondary usage of prehistoric housepits is a picture entitled "Snake River Country, April 6, 1924." This and the previous picture are taken from the collection of Ruth Turner and have no further notes than what is presented on the pictures. This picture shows from the far left a water tank and possible house on the river side of the Northern Pacific tracks and a tool shed and possibly other structure on the land side of the tracks. All of these are well downriver from the bridge and also from what appears to be remnants of the construction camp. The area occupied by the largest compound of buildings in picture No. 1 appears to be a noticable dark spot in this picture. The road that passes between the Fife structure and tracks and then drops down to the level of the tracks in picture No. 1 is still apparent in this 1924 picture.

Conclusions

From written documents, photographic evidence, and informant interviews it is apparent that a complex series of buildings numbering approximately 30, over two-thirds of which were downstream of the bridge, were erected specifically for the construction of the Joso Bridge. It is well documented that the site was in use possibly in 1911, probably in 1912, and definitely in 1913 and 1914. These structures were probably removed immediately after completion of

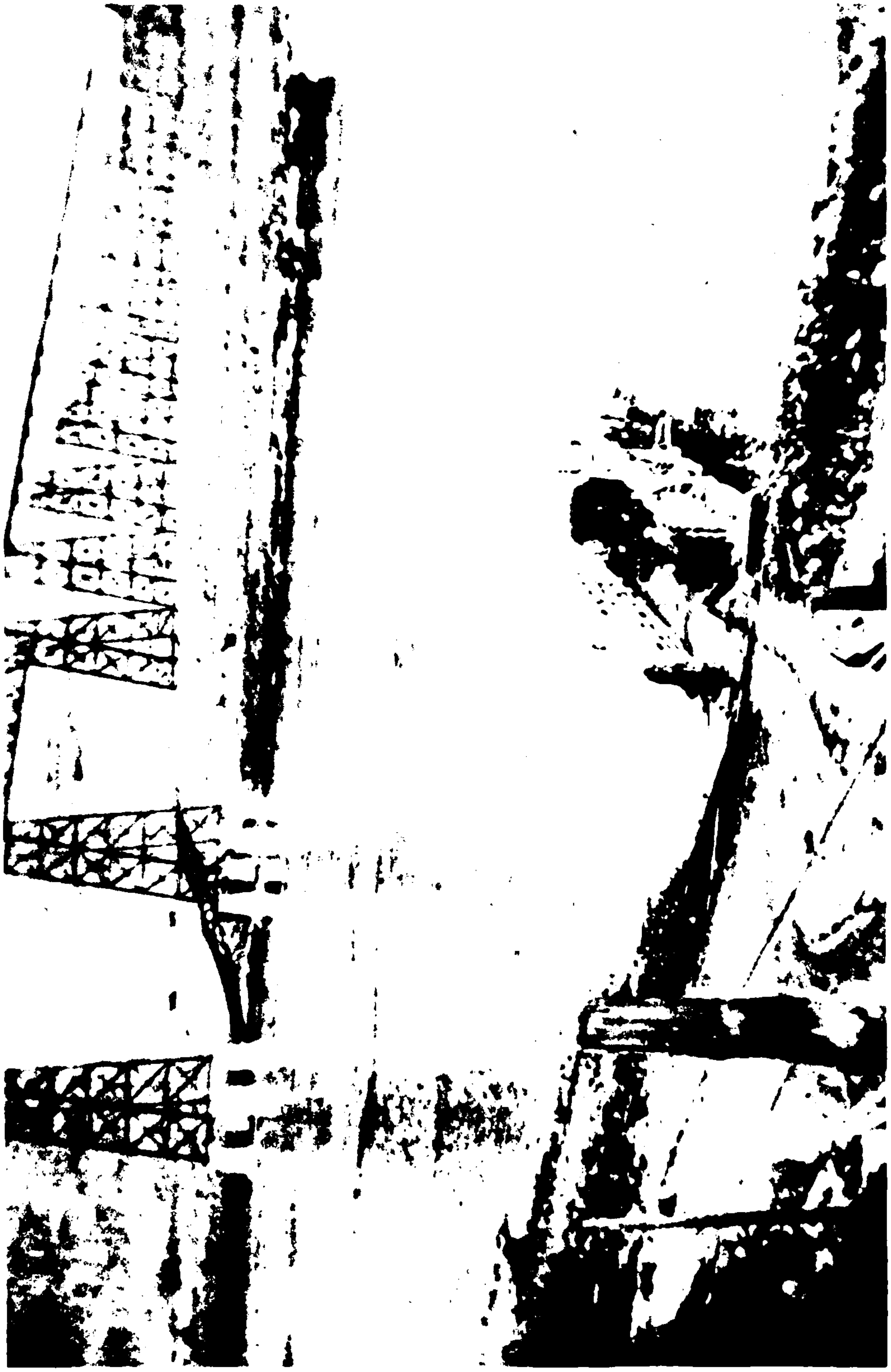

Fig. 11. Lyons Ferry, 1918. Courtesy of Ruth Turner.

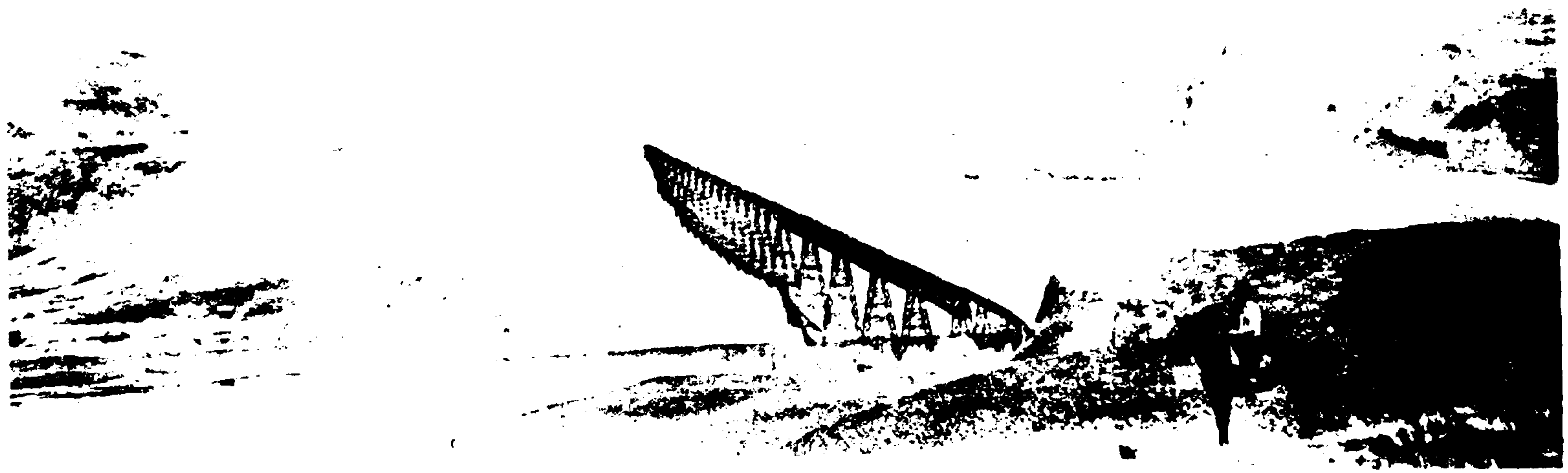

Fig. 12. Joso Bridge, 1924. Courtesy of Ruth Turner.

the bridge. They apparently were gone by 1918 from photographic evidence, definitely gone by 1921 from informant evidence and 1924 from photographic evidence. We know the names of several of the supervisory personnel living in the town as well as informants' indications that there was a work force also housed there. We also know from informants that work crews included Anglos, Blacks, and Chinese.

The long historical record from the area combined with the good photographic record of a short duration construction camp all suggest the need for further archaeological research on this site. The site, while representing a brief span of time, was occupied long enough for a usable sample. Most construction camps are occupied for a period of only a few weeks and thus do not provide an adequate comparative sample. The remote area has lead to excellent preservation of this camp, a unique situation in the Pacific Northwest. With increased use of Lyons Ferry State Park and establishment of a fish hatchery this unique site will soon be destroyed. The multi-ethnic make-up of the construction crew is also of major significance.

Historical archaeologist are finding that drawings of engineering feats plus copies of Sears, Roebuck catalogues simply do not tell us enough about the people and how they lived. The archaeological testing has already told us something that was previously unknown, that there were women situated at the site. The short duration and tight chronological controls make this site also extremely important from the point of view of pure research in historical archaeology. The site represents a unit collection that should be preserved for future research. Test excavations have also shown that the privy pits are extremely shallow, thus making these features even more susceptible to close and tight chronological control.

In summary this site is worthy of further extended surface collection and excavation not only because it represents a unique cultural resource for understanding early twentieth century construction but also as a resource for future archaeologists.

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CHAPTER V

ARCHAEOLOGICAL TESTING AT "TRESTLE CITY," A RAILROAD CONSTRUCTION CAMP OF THE EARLY 1900'S

by

Gregory C. Cleveland

"Trestle City" was an ephemeral construction camp that was occupied during the few years preceding the completion of the Joso or Snake River viaduct which was placed in operation on September 15, 1914 by the Oregon-Washington Railroad and Navigation Company (O.W.R. & N.), a company controlled by the Union Pacific Railway.

The Kelly-Atkinson Construction Company fabricated the trestle superstructure, and the Missouri Valley Bridge and Iron Company and their subcontractors, Caughen, Bointin and Company, were responsible for the substructure. The associated construction camps were situated on the Franklin County side of the Snake, the Columbia and Walla Walla County sides having much less space next to the abutment area as a basalt cliff face at the river's edge with a steep talus slope and a narrow road prohibited or confounded habitation there. The Franklin County side provided ample flat, open space on both sides of the proposed viaduct for construction activities and habitation. This flat was an ideal flood plain for the construction crew(s) to set up, close to water, close to their job, at the end of the rail line from Spokane, a major logistics base. The trestle overpassed the already existing N.P. line paralleling the Snake River and crossing the Palouse River at the mouth. This was the "Lowline," and the O.W.R. & N. was the "Highline," a product of the measure:countermeasure strategies of the two major railroads competing for Inland Empire markets (Meinig 1968).

Other Construction Camps and Related Sites

Informant knowledge of this or other camps supporting the viaduct construction is not available to this author, however, a project supporting steelyard in Hooper, Washington, 15 rail miles to the northeast must have necessitated a semi-permanent camp and, too, it is known that construction of the trestle preceded from "both ends simultaneously" (Railway Age Gazette (1915:624) and may have resulted in crews camped at both ends of the proposed trestle. This later assumption seems unlikely because of the aforementioned lack of space on the Walla Walla side, the presence of a ferry (Lyons Ferry) next to the trestle which could have provided transport if needed and the major railroad supply line, coming to the site from Spokane Falls via Hooper, where major trestle components were stored, assembled, and transported by derrick the rest of the way to the project.

At least three construction crews, probably isolated spatially and temporally, are inferred to have participated in the project. The substructure required extensive mapping of the basalt bedrock under the river and because of its variable depth, the span lengths between pedestals were arranged to obtain economy in the foundations. Given this information (ibid. 1915:624) one could infer that the substructure, including a total of 16 river pedestals was completed or nearly so before the on-site trestle construction itself was initiated. The highest pedestal (95 feet) extended 64 feet below the water surface. These data in light of the discharge characteristics of the Snake River give the reader some idea of the magnitude of this initial construction work at the project site and provide a rough idea of the logistical support needed.

Continuing in a more speculative vein, we can divide the labor force into specialists. Separate settlements could be posited for the

concrete workers of the Missouri Valley Bridge and Iron Company, and the steelworkers of the superstructure contractor, the Kelly-Atkinson Construction Company. Other workers must have participated in the "Highline" route as far as the railbed construction itself was concerned.

According to Stratton and Lindeman (1976) a construction camp at Chew on the Columbia County side downriver at Field's Gulch accommodated 350 to 500 Chinese laborers who worked on the "Highline" railroad route in the early 1900s. According to their assessment as of 1975, part of this camp may still be exposed above water. These workers probably constituted a separate labor force of specialized "wage slaves" responsible for the actual hand labor associated with grading and possibly track laying.

Squirt Cave, 45WW25, is yet another isolated railroad site, located 1,000 feet downstream from the Walla Walla County abutment of the Joso Viaduct. This cave contained prehistoric storage facilities which were partially excavated by the author and several others under the immediate supervision of John D. Combes (Combes 1969). On the surface of this extremely dry and protected cave were scattered newspapers printed in Chinese and dated 1910, and if memory serves, Roland "Squirt" Marmes had recovered from the cave several historic period implements such as hand picks prior to the involvement of Washington State University. The cave was probably used for shade, storage and intermittent habitation by railroad workers. Indications are at present that Chinese labor was used in menial tasks and would not have been used for the specialized tasks involved in trestle construction. Popular knowledge that Chinese and Blacks participated in trestle construction does exist but as of this writing can only be considered hearsay.

Another railroad site, the Northern Pacific siding of Perry was situated just downstream from the Joso Trestle and was associated with a section or station house, a water tower (?), and apparently a shop (Figure 13). Evidence for the latter comes not only from photographs in the possession of Ruth Turner of Starbuck (copies now at University of Idaho Laboratory of Anthropology), but from occupational debris situated within Depression 5, overlying evidence of aboriginal occupation (Figure 13).

Section houses on most Northwest Railroad systems were situated near the center of a specified section of track over which the foreman and his crew performed routine maintenance and visual monitoring for problem areas. Often the section foreman's family lived with him at the section house, as is the case today in some areas. It was also common that a shop was associated with the section house; in fact, the two are clearly associated in the minds of many railroaders today (LeRoy Allen, personal communication).

Survey

An intensive reconnaissance of the project area was conducted to locate historic features. This was accomplished by walking interval (approximately 10 meter) transects and staking locations to be later identified and mapped. The approach was coarse grained such that structural depressions and obvious associations were flagged but random or small "individual" items were not. Where vegetation was heavy, especially in the Canadian thistle patches on disturbed ground, our coverage was poorer. Concentrations or scatters of items not immediately recognized were not recorded. For example, subsequent to the survey several concentrations of charcoal and cinders were noted but not mapped. The May 18th St. Helen's

Figure 13. Locations of historic structures and features discussed in the text.

ash obscured some of these items of small size (approximately 1/8 inch of ash), but this must be considered a minor factor in the project area. Rattlesnakes were noted in high density vegetation areas and led to some avoidance and possible bias. The relative open area guaranteed good coverage and probably 90 percent of the major historic associations were mapped as point data, each point indicating an association of cultural items.

Mapping

A baseline was established which ran E-W across the project area and each scatter or depression was plotted as a point during this initial procedure. Subsequently, the major depressions were mapped in greater detail and a base map (Figure 14) detailing the major associations was made. During this initial field exercise, a visit by the deputy State Historic Preservation Office and subsequent discussion discouraged the production of a really fine-grained map of the historic component given the serious consideration of future mapping of the site using a moveable grid, a technique used with success on other historic sites (Jeanne Welch, personal communication). This map was to have been produced under separate contract.

Community Structure: Photographic Information

Background

"Trestle City" has been known to the archaeological community since the early 1950s when a survey crew from Washington State College located historic remains here. Under R. D. Daugherty, R. Sprague participated in that original survey and subsequently recorded the site in 1966 as a construction camp associated with the trestle or viaduct construction.

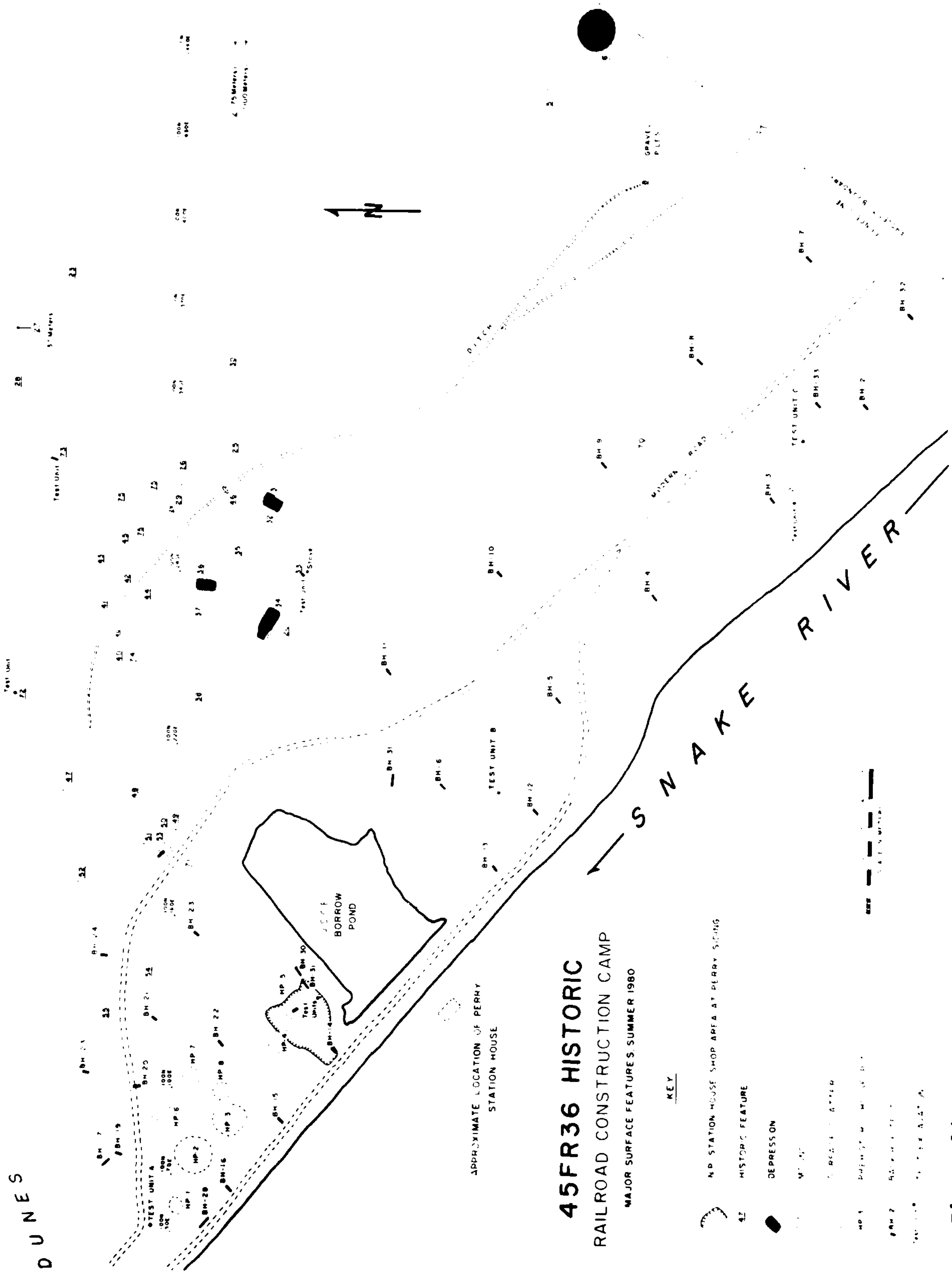

45FR36 HISTORIC
RAILROAD CONSTRUCTION CAMP
MAJOR SURFACE FEATURES, SUMMER 1980
KEY
HISTORIC FEATURE
DEPRESSION
SNAKE RIVER
DUNES
BORROW POND
APPROXIMATE LOCATION OF PERRY STATION HOUSE
DITCH
N

Figure 14.

45FR36 Historic Railroad Construction Camp
Major Surface Features - Summer, 1980

Key:

1 - Well cap (recent)

2 - Gravel pile

3 - Cluster of 3 buckets

4 - Cedar post with barbed wire tangle

5 - Gravel pile

6 - Large depression

7 - Terminus of earth ditch at project boundary

8 - Terminus of "top" canal

12 - Scatter of historic debris on "River Row" and locus of privy sized depression test

23 - Privy sized depression (1-2 m diameter)

25 - Privy sized depression (1-2 m diameter)

26 - Privy sized depression (1-2 m diameter)

27 - Major can dump

28 - Privy sized depression (1-2 m diameter)

29 - Oblong depression (3 x 4 m)

30 - Privy sized depression (1-2 m diameter)

31 - Large depression (ca. 5 x 6 m and 1 to 1.5 m deep)

32 - Cluster of 1-inch thick wood sheathing fragments (cedar?)

33 - Wood cook stove remnants near center of a major scatter of glass, coal, cinder, and metal fragments

34 - Large depression (5 x 7 m)

35 - Cluster of 1-inch thick wood sheathing fragments (cedar)

36 - Large depression with associated sheathing fragments and coal cinders

37 - Privy sized depression (1-2 m diameter)

Key (continued):

38 - Privy sized depression (1-2 m diameter)

40 - Privy sized depression with associated glass and ceramic sherds

41 - A 2 x .7 m "trench" .15 m deep; sardine can associated

42 - Privy sized depression; associated scatter of tin can fragments

43 - Mound of cinder and partially burned coal fragments in a sand matrix 3 m diameter at base

44 - Privy sized depression with associated 1-inch width sheathing board fragments

45 - .5 m diameter mound of concrete chunks with adhering mortar

46 - Backhoe test across earth ditch

47 - Tin can dump scatter

48 - Privy sized depressions (1-2 m diameter)

49 - Privy sized depressions (1-2 m diameter)

50 - Large 2 m diameter depression

51 - Earthen (silty sand) mound .35 m high, 10 m long, and 1.5 m wide

52 - 1 m diameter mound of cinder and coal rich sediment (silty sand)

53 - A large (ca. 7 x 5 m) rectangular depression

54 - Small can dump

55 - Privy sized depression with bottle glass, ceramics

70 - Scatter of railroad spikes and bolts with nuts

71 - Cast iron bed frame

72 - Privy sized depression; associated scatter of tin can and glass fragments

73 - Medium sized depression; associated scatter of tin can and glass fragments

74 - Lamp parts

75 - Small depressions

One of Sprague's previous informants, a Mr. R. A. Fife, was the timekeeper on the project and an amateur photographer as well. It is in this later role that Mr. Fife, now deceased, became valuable to the archaeological testing here. His photograph (Figure 13) dated 1913 to 1914 shows the camp toward the end of trestle construction. The information accompanying the photo is sparce, but he stated that the small frame structure in the lower right (#1) corner was his temporary dwelling and that the remaining three larger structures (#3, #5, and #7) along the river (River Row) were foremen's and superintendent's dwellings.

Apart from this, he also disclosed to Mrs. R. Turner that the bunkhouse for the men was the large structure at the middle or middle left of this photo (R. Sprague, personal communication). These "hard" facts, along with the photograph itself constituted the extent of our pretest site information. A quick walkover of the area in March of 1980 has convinced the authors that much of the camp remained as surface scatter.

Fife's photo, probably taken from the vicinity of the first tower over the river on the Franklin County side, faces roughly north. The River Row is in the foreground, the bunkhouse is in the "central cluster" of buildings at mid-photo. Mr. Fife also divulged what appears to be the one major division in the work force reflected in habitation structures, i.e., the foremen's shacks vs. the laborer's bunkhouse. Essentially, this leaves the additional buildings of the central cluster unaccounted for as to function. Within this cluster, three of the structures are large enough to serve as a mess hall (#12, #14, #18). The larger structure on the left (#14) seems the likely candidate given size alone. However, the lack of clearly recognized stove pipes out of the roof suggests to this writer that if this building was a mess hall, the kitchen was separate, possibly

in the other large central structure to the right with several protruding stove pipes (#18). The smaller buildings in this cluster could constitute storage facilities and cooks' quarters.

This hypothetical scenario is backed up by other information sources within the photograph itself. The paths generally converge on the proposed mess hall, both from the foremen's shacks on River Row and from the proposed bunkhouse. The well-used wagon road (B) heads toward this central cluster from the lower right, loops and comes back; and the one central structure, the right-most (#22) that appears to be a storage facility or provisions shack (no windows, no stack), is close to the proposed kitchen and to a domicile sized cooks' quarters (#20), a protective location.

The Archaeological Distribution and its Formation

Disposal Modes

There has been a great deal of discussion of late on the formation processes of the archaeological record (Schiffer 1976; Binford 1977) in order that the archaeologist be made aware of the patterned way in which artifacts and discarded items find their way into the archaeological record. For the sake of the present concern with historic remains, the following heuristic scheme shows some of the alternative ways this occurs:

"Cultural Transformation" Modes

Lost (spatially and temporally random--small items)

Disposed or Dumped

in situ abondonment (patterned)

Specified loci trash pits, privys, etc.

Random loci anywhere; tossed cigarette butts, apple cores, etc.

Structural remains

Generally speaking, a "size effect" (not in the sense of House: 1972) is occurring in the process of forming the archaeological record. In this sense, usually only the small items are lost whereas large structural items are abandoned. Those items of mid-range size are, quite often purposefully disposed of. Above a certain size threshold this mid-range class of items is difficult to lose and certain items such as empty food containers can be unsanitary or a nuisance to have around. Another class of items, those that are curated, might include anything from gold pocket watches and coins to "personal items" for the moment "ready" to be "transformed" (sometimes in burials) into an archaeological context.

This simple but heuristic model, though not theoretically sophisticated, requires further discussion. The categorization of "disposed" items as mid-range in size is again only generally the case and is partially a result of industrial "container culture" where consumer items are packaged in disposable containers of a medium size. This distinction of the disposed category applies to consumer items as well as to "amorphous" wastes from coal fires, ashes from trash burning. Kitchen wastes and the disposal of organics such as bone and spoiled food substances fit this general pattern, too. Isolation of organic wastes is considered a sanitation problem, and privies and trash dumps contain the signature of this disposal mode.

Historic Structures: Toward a Useful Classification

The need for thermal homeostasis arises for all organisms in temperate latitudes. Structural facilities are not peculiar to man in the Snake River region, and in the historic periods, above ground buildings are the most common form of habitation or dwelling feature. Other special purpose or intermittent use facilities are "bermed" or subterranean in nature.

Historic Period Enclosed Structures

- above ground
  - habitation
  - storage
  - communal
- semi-subterranean
  - habitation
  - privies
  - storage
- subterranean
  - storage
  - special use

In categorizing the historic structures within the Lyons Ferry Hatchery project area, the dichotomy between maintenance and construction (investment) is useful from an energetic standpoint. The "construction camp(s)," associated with the Joso trestle is the logistic base of a specialized crew involved with monumental construction. The so-called station or Section House at Perry, archaeologically extant in the area, is a maintenance oriented facility of long duration in comparison.

Construction Techniques

From a labor investment standpoint, the structures at the Joso camp were special purpose, short term and therefore less substantial than what otherwise might be. There was no visible surficial evidence for the use of continuous foundations or even post on rock sill techniques. Most likely, posts on block construction was used for the above ground structures. In Mr. Fife's photo (Figure 13) all the structures appear to be wood framed, probably of rough-sawn pine 2 x 4s. The larger structures have gabled roofs, the timekeeper's shack (#1) and several others have shed roofs, as do all visible privies. The outer skin of the above ground structures appear to be rough-sawn pine sheathing boards, probably on top of tar paper as no battens are visible in the photograph. Roof skin is undetermined, probably paper.

Fireplaces

Fireplaces or stoves are evident in Mr. Fife's photograph indirectly where stovepipes protrude from several of the structures. Two types were discovered archaeologically, the kitchen cook stove associated with the Perry Station House test overlying Housepit 5 and within a subterranean feature that may have been associated with above ground structural remains and oven remnants near #14, the proposed mess hall or kitchen area. Parlor stoves or "trash burner" fragments were among surface finds near structure #1 or #2 (see Figure 13) and in midden from the trash mound in Housepit 5.

Figure #45 is a mound of concrete chunks with mortar suggesting to this writer that a more permanent fireplace facility possibly with a chimney may have been constructed here. The above-ground structure thought to be a mess hall (#14) may have a chimney of this nature (?).

Archaeological Features and Archaeological Testing

Survey and staking of historic features resulted in a wide distribution of coded stakes across the project area. It was obvious that the surface features so recorded were directly a result of the "Trestle City" camp based on the relative position of features and the nature of the surface scatter of artifacts. Remains of structural features such as one-inch thick milled lumber siding or sheathing fragments were common, sometimes next to a residual depression and its berm or mound of back dirt, sometimes isolated.

In-field comparisons to the Fife photograph were common. No amount of scanning, however, allowed positive identification and linking of archaeological pits or depression features with buildings in this photograph. Several reasons may account for this. It is neither a fault

of Fife's photograph or our lack of visual acuity with a magnifier, rather it probably stems from privy pits having been completely filled in when a move was made or storage pits such as subterranean root cellars being covered or hidden from view within a shelter or shack.

Surface scatters and trash heaps are visible along River Row just downstream from shacks #5 and #7. These were not positively linked to extant remains either, but scatters of historic items do exist here. Figure 15 is a profile of a privy pit associated with either structures #3 or #5 on River Row. The privy location for Fife's shack is not in his photography but upriver, back toward the trestle. This structure has been located in other photographs. As can be appreciated in this profile, the cobble basement is fairly shallow and may have required privies to be moved frequently. Sample contents of this feature appear in Table 5.1.

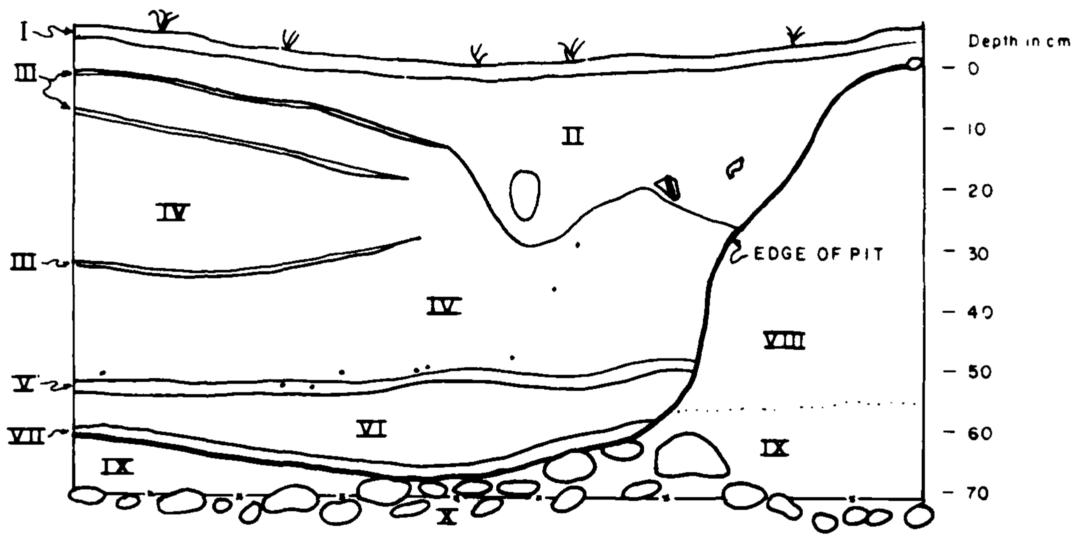
Because much of Trestle City's remains were visible above ground and Corps representatives argued this fact would preclude any excavation during a possible mitigation phase, the question of subsurface remains became an issue, and to resolve this a series of test excavations were conducted. These tests were not conceived to produce samples of comparable volume for developing a quantitative or comparative approach at this juncture. They were instead conceived of as grab samples from midden within depressions and from other features such as mounds or, for example, the earthen canal feature which was backhoe tested.

Excavated tests were conducted of the following surface features identified on Figure 14:

Historic mound H.P. #5	Perry Station House area overlying aboriginal depression
#27	Major tin can dump (railroad construction era)
#72	Privy-sized depression with surface scatter

PRIVY PIT

WEST WALL PROFILE



SOIL DESCRIPTIONS

- I Mt. St. Helens Ash and Surface Organics
- II Dark Brown Medium Grained Sand
- III Very Dark Brown Sand Lenses (Possibly Burned Material)
- IV Medium Brown Sand With Gravel
- V Light Gray Silt Lens
- VI Dark Brown Sand With Silt Spotting
- VII Loosely Consolidated Organic Layer
- VIII Medium Brown Fine Grained Sand
- IX Highly Compacted Light Gray Silt
- X Cobble Layer

KEY

- Cobble
- Bailing Wire Extending From Wall
- Rusted Cans
- Base of Excavation

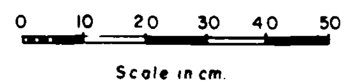


Figure 15. Profile of test unit excavated out of small depression thought to be a privy located near a foreman's shack near river, location on base map (Figure 14). Notice shallow excavation to cobble basement.

TABLE 5.1

Weight in Grams of Various Classes of Items and Material Wastes From Tests of Four Historic Disposal Features in the Lyons Ferry Hatchery Area (See Base Map)

Map Location of Tested Disposal Location	Coal/Cinders	Wood/Charcoal	Butchered Bone (Sawed)	Cork	Leather & Rubber Shoe Material	Tar Paper	Glass			Ceramic	Metal			Nails	Spikes	Bottle Caps	Rubber	Other
							Bottle	Window	Other		Unidentified	Identified	Can					
Depression #72	323.6	28.8	536.3	13	461	121.5	10,214.3	1.2	18.9	282.2	5,943	881.5	2,336.8	47	25	34.9	60.2	2.0
Depression #12	59.5	32.8	213.9	-	-	-	43	-	-	184.9	147.6	200.4	545.7	-	-	-	-	-
Mound in Dep. #5	3,115.2	98.8	229.8	-	38.0	-	793.1	51.6	8.8	40.8	714.4	389.7	375.6	199.9	1,628.9	-	4.6	20
Depression #73	5,859.2	72.3	34.9	10.9	325.2	-	5,233	36.4	54.1	505.7	233.3	80.1	191.5	299	-	-	110.2	147.4

#73 Medium-sized depression with surface scatter

#46 Earthen canal or trench feature

#53 Large pit or depression

#12 Privy-sized depression with surface scatter

The grab samples from these tests excavated by backhoe and hand were evaluated on the assumption that the presence or absence of classes of artifacts define basic activity patterning. The utility of such an approach lies in developing indices for comparing areas within a site, site to site, and regional patterns that can be systematically evaluated. For present purposes the following preliminary questions were asked:

1. What differences exist among the various features in terms of content? (Content being defined as the presence and weight in grams of an artifact class.)

2. How do these differences relate to the "disposal modes" model generated?

In general the area used for disposal was back of the construction camp near the dune trains that presently extend from the water near the downstream end of the prehistoric pithouses up to the Franklin County abutment area of the trestle itself (see Mierendorf, this report). This dune area and the flat areas of flood plain between the dunes exhibit historic items apparently dumped or thrown here in an out-of-the-way spot. A modern "farm dump" and recent garbage can be found here. A brief description of each historic test follows.

Feature #27 - Can Dump

A major tin can dumping area (#27) was tested; two sizes of cans occurred here as a surface scatter with no subterranean component. Large "coffee" sized cans and smaller "condensed milk" sized cans were the two prevalent artifacts. Their use together is supported by the occasional

"milk" can having been stuffed into a "coffee" can. Both sizes were opened with a butcher or other large knife and in one case a flat, green Lucky Strike tobacco can was inside a "coffee" sized can. Speculation suggests this uniformity of association is related to regular coffee breaks by the workers; the fact that all cans are solder-sealed links them to the early 20th century in age and supports their speculative association with the trestle construction (R. Sprague, personal communication). The Lucky Strike tobacco can is green in color and therefore pre-war.

Feature #72

This was another dump area that was evident on the surface and did have subterranean material. It, too, was near the base of the dune train (see map, Figure 14). It contained a diversity of material (see Table 5.1) that includes household items as well as construction materials. Alcoholic beverage bottles and fragments thereof constitute nearly 50 percent of our sample by weight and metallic objects approximately 32 percent by weight. The following list presents some identified metallic items:

Identified Metallic Items or Fragments

Bucket handle	Shoe buckle
Bailing type wire	Cup (enamel ware)
Shoe rivets	Can key
Shotshell base	Clock frame
Stove part	Buttons

This particular dump area was approximately one meter in depth and was identified as a shallow depression with a surface scatter of broken

glass and metal can fragments. Given the broad spectrum of items included, it can be considered a household dump.

The faunal component (536.3 grams or 2.5 percent) of our sample was sawed mammal bone (mostly sheep) comprised of roast bones of high muscle mass anatomical parts.

Feature #73

Located in the same general area back of the camp along the base of the dune train (see map, Figure 14), this feature was a shallow surface depression with a scatter of glass sherds and metal fragments. This depth of midden was shallow (approximately .20 meters below surface) and no visible excavation was apparent in the sandy matrix.

Content of our sample suggests a basic similarity to feature #72. A much greater volume of coal and cinders, both in weight and sample present, is apparent (see Table 5.1).

Trash Mound in Prehistoric Depression #5

This mound is situated in prehistoric depression #5 and overlies the prehistoric pithouse occupation(s) there. Figure 16 shows its general provenience within the pit and the association with surface remains of the Perry Section House complex. This general area is visible on several photographs published in Sprague's overview (this report) and the wooden structure inland of the Northern Pacific tracks may have been a shop area associated with the station or Section House, although Sprague (personal communication) suggests that the Station House itself was some 200 meters upstream on the flood plain below the tracks. This would not negate the possibility that the historic distribution within the prehistoric depression (Housepit 5) is associated with Perry. Historic disturbances within

housepit 5 confused our identification of this prehistoric feature until the 3 feet high Canadian thistle and the association of grasses and forbes were removed. Once achieved, the outlines of a circular depression truncated on the eastern edge by U.S. Corps of Engineers borrow activity was more clearly seen. Mounds of trash and historic items were also exposed and indication of historic use of the area was obvious. Rock alignment of small (ca. 20 centimeters) cobbles on each side of an entry/exit path supported the notion of an overlying historic structure but no other explicit structural features were noted.

Our test here involved the bisection of a centrally located mound within the depression. The most prevalent artifact types by numbers and weight, aside from the ubiquitous coal and cinder fraction, were railroad spikes and large wire nails. Stove parts, a flattened enamelware coffeepot and bottle glass fragments were also found (see Table 5.1). Butchered bone was also a component of this mound (229. grams) and along with a peach pit constituted the food remains. Solder-sealed metal cans were present but few in number.

Outside of this depression on its eastern edge a small length of railroad track was lying on the surface and showed some indication of use as an anvil (see Figure 16). The area around the "anvil" was littered with coal fragments in an oxidized earthen matrix. A cluster of subangular basalt cobbles within this oxidized matrix suggested a hearth. A shallow 1 x 1 m test into this oxidized matrix produced small pieces of coal and cinder but no helpful artifactual material that might relate this feature to a forge or workshop area.

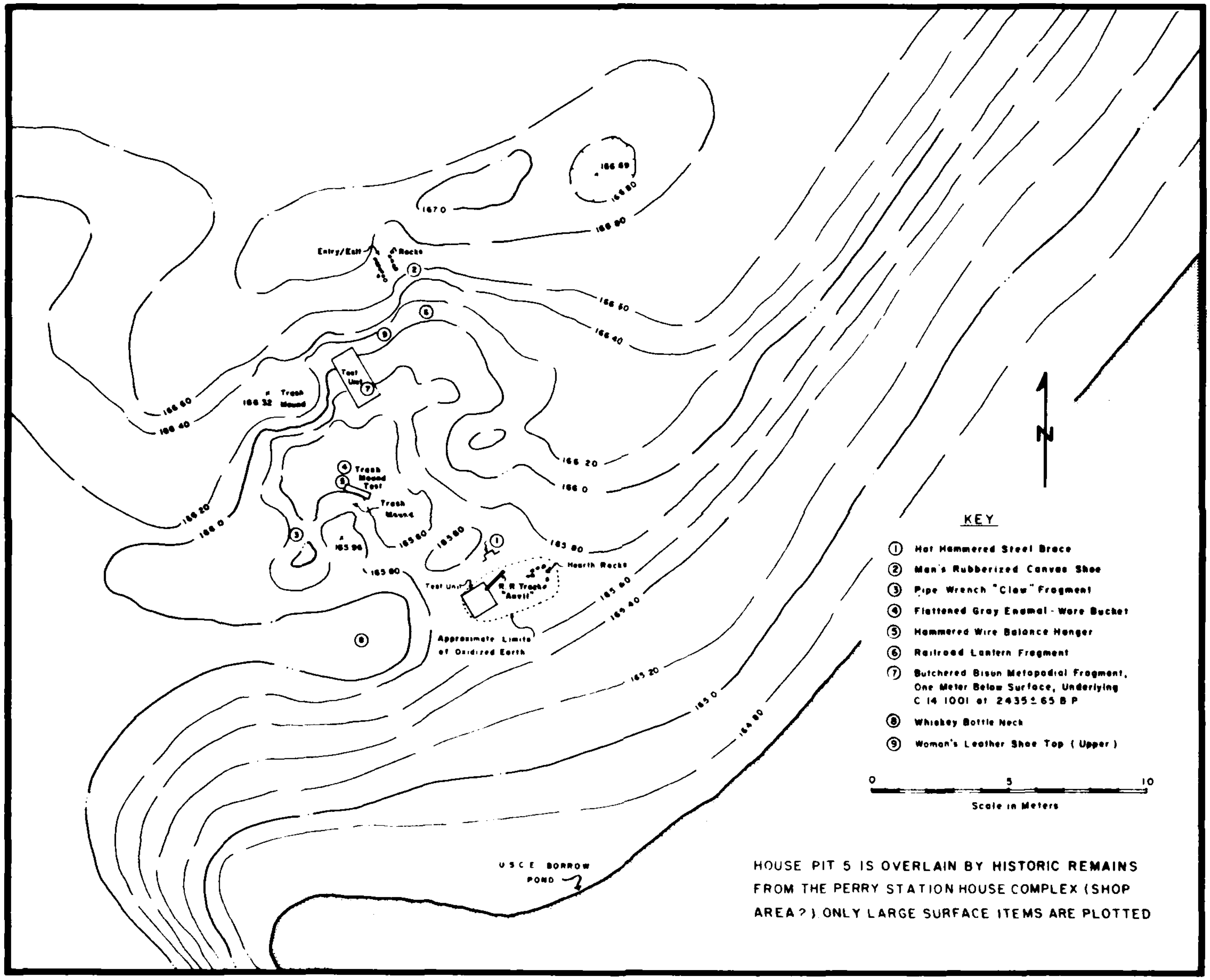


Figure 16. Housepit #5 area showing contours, historic features, and test units.

Feature #12

Another test was placed in a small surface depression near "River Row," the location of R. A. Fife's (project timekeeper) and the foremen's shacks. This area is visible in the Fife photograph (Figure 13) and several "privys" can be seen. Other photographs suggest that the privy associated with Mr. Fife's shack (Figure 13, #1) is closer to the trestle and not present in the photograph. Our test here (see Figures 15, 17) suggests that this depression was a privy. (Lens VII is probably decayed fecal matter.) The shallow nature of the soil matrix in this area may have necessitated movement of the privys on occasion.

Feature #46

Feature #46 is a linear trench extending from the inland side of the camp to the lower ground near the trestle. The suggestion that this feature would serve to divert runoff (Jerry Thayer, personal communication) and was placed between the camp and the sloping topography of the hillside (see aerial photo, Figure 18) for this purpose bears mentioning, although runoff to warrant such an endeavor along this branch of the Snake River must be rare indeed. Perhaps it was placed here as insurance by an individual unfamiliar with local precipitation patterns. In any event, this feature was sectioned with a backhoe to determine if it may have served as a water channel or canal of some kind. The feature showed no evidence recognized stratigraphically that it ever held water. Several alcoholic beverage bottle sherds were discovered in the exposed profiles.

Feature #53

This is a large rectangular depression (ca. 5 x 7 m) and approximately one meter deep at its center. A galvanized metal washtub, an

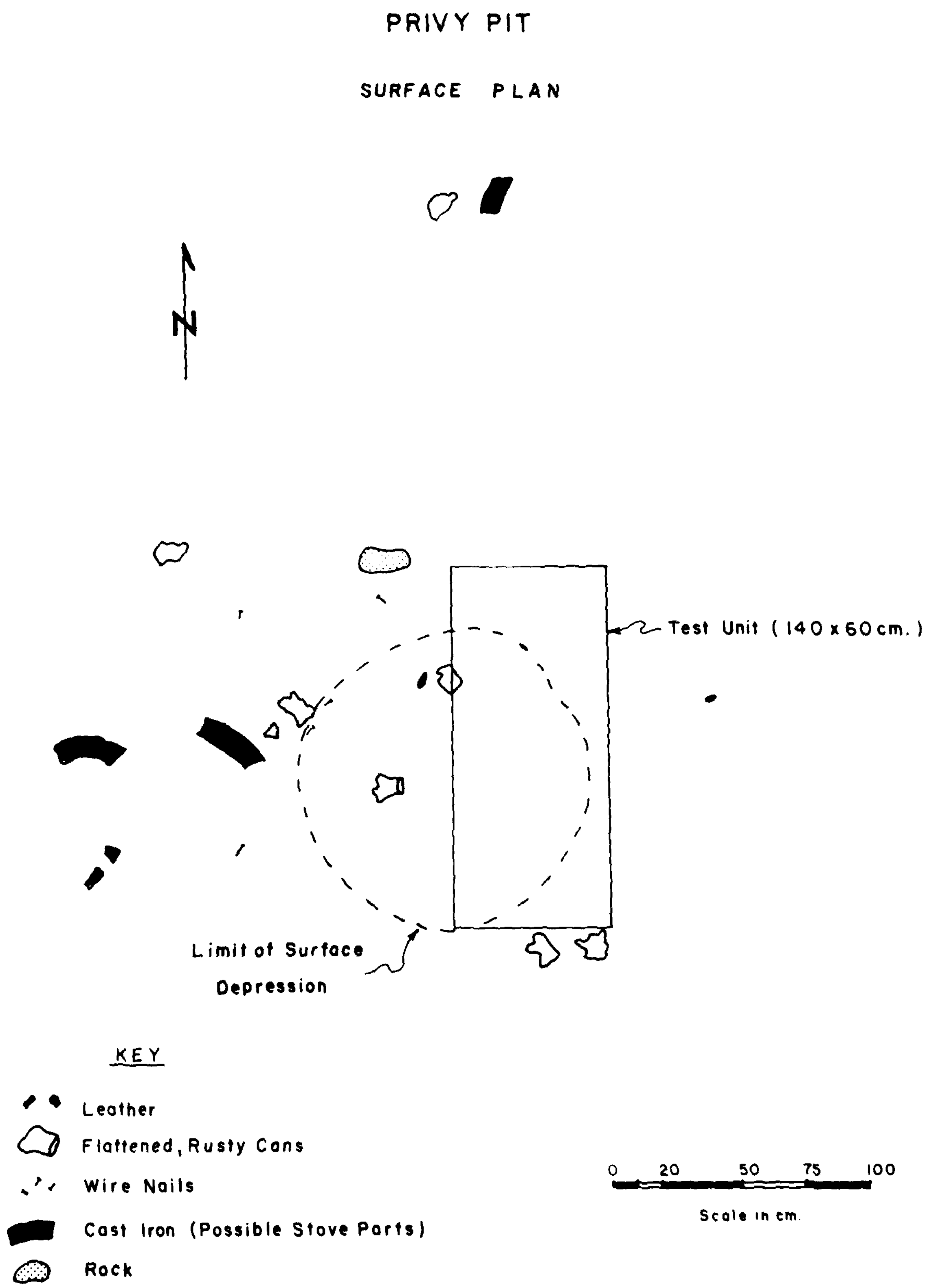


Figure 17. Plan of small depression and immediate area showing the location of historic surface artifacts and the location of test unit. This depression is #12 on base map (Figure 14) near the river and may have been a privy associated with a foreman's shack on River Row (see text).

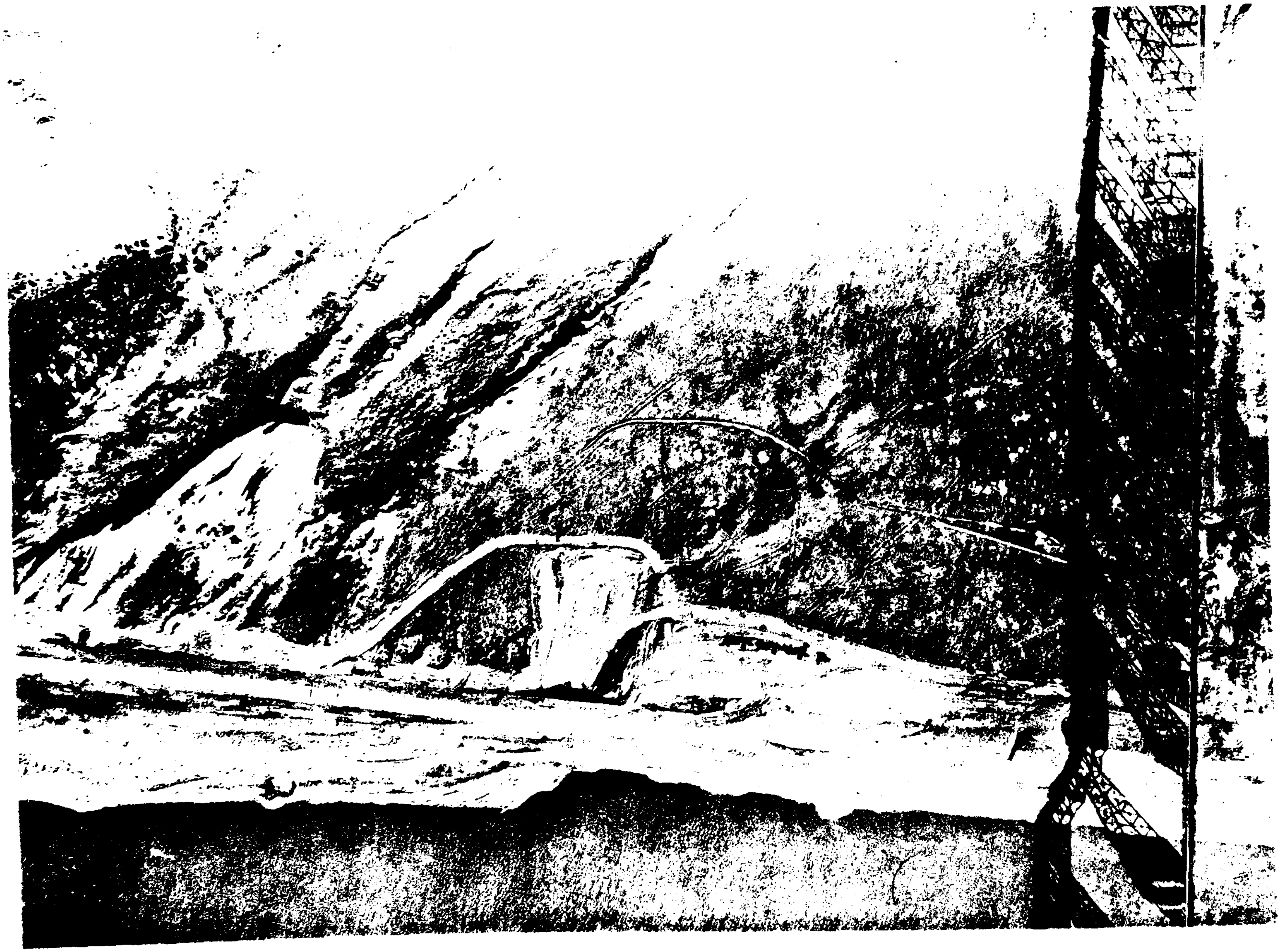


Figure 18. Aerial photo of project area taken in winter of 1969--just prior to raising of Lower Monumental Pool. Various disturbances are clearly evident as are historic remains (right center) and at least four prehistoric housepits (to left of borrow pit).

enamelware wash pan, an enamelware "cooking" bucket, and a fragment of a wood-burning kitchen type cook stove lie within this feature. Just across the modern road and near the U.S. Corps of Engineers borrow area (now a pond) lies a wire bed frame.

A backhoe test through the lip or berm down to approximately 1.2 meters below surface revealed a lens of rusted cans and a section of 1-inch diameter steel water pipe. Suggestions for this feature have ranged from a washroom sump hole to an abandoned root cellar or underground storage facility.

Discussion

The testing of historic features within the Lyons Ferry Hatchery Project revealed that subterranean archaeological features do in fact exist; a point of discussion which testing has confirmed. These features were judgmentally selected for testing and the samples were not taken as standardized volumes, rather selective tests were performed. Five disposal features (#12, #27, #72, #73 and the mound in Housepit 5) were tested and two depressions were trenched with a backhoe (#46, #53).

Feature #27 was entirely surficial and contained only cans. Features #72 and #73 were dumps with a broad spectrum of household related items suggesting association with the habitation structures in the camp. The mound in Housepit 5 may have been associated with the Perry Station House. The small depression (#12) along River Row was probably a privy pit that was used for occasional refuse dumping, aside from its sanitation toilet function.

The backhoe tests of feature #46 and #53 which were cross-sectioned for stratigraphic information, revealed little artifactual material. The function of either remains speculative.

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CHAPTER VI

A PRELIMINARY INTERPRETATION OF THE GEOLOGICAL SEQUENCE AT 45FR36

by

Robert R. Mierendorf

Introduction

The following report is a preliminary description and interpretation of geological strata at archaeological site 45FR36, near the mouth of the Palouse River, Franklin County, Washington. Field observations were recorded by the author on July 19, 1980, at the same time that a crew from Washington State University conducted archaeological tests at the site. A series of backhoe trenches and excavation units provided exposures of stratigraphic profiles.

The purpose of this report is to address a number of problems relevant to the evaluation and management of this cultural resource on lands being managed by the U.S. Army Corps of Engineers. The specific problems are these:

(1) To characterize the degree of stratigraphic complexity, including the lateral and vertical variability apparent at the site.

(2) To correlate the stratigraphic sequence with existing archaeological chronologies for the area.

(3) To infer the geologic history of the stratigraphic column in which archaeological remains are found

(4) If possible, to geologically date the archaeological deposits.

(5) To identify potential impacts to the site from current and future geological processes which relate to management of the property.

Geology of the Project Area

The project area is located on a terrace adjacent to the north bank of the Snake River. Geologically, the area is characterized by Pleistocene sediments of glacial origin (Huntting et al. 1961). Miocene volcanic rocks underlie these sediments and are exposed along the canyon walls.

Figure 19 is a map showing the distribution of geomorphic features within the project area. Disturbances related to dam construction activities occur in a strip adjacent to the Snake River. Bordering this strip is a broad flat that slopes gently up to the base of the canyon walls. This flat is characterized by a set of active and vegetated dunes. These dunes are of two types. The first consists of parabolic or U-shaped dunes having a small deflation basin (blowout) between the arms. The second type consists of longitudinal dunes that have formed on the lee side of the larger parabolic dunes. Between the dune fields that occupy the broad flat are relatively low interdune areas covered with a thin sheet of aeolian sand.

The downwind end of the dune and interdune areas grade into the base of steep talus slopes which are banked against the basalt outcrops. Other colluvial sediments drape portions of the steep canyon walls. Alluvial fans spill onto the flats below where drainage of the uplands is provided by breaks in the canyon walls. Only the most prominent cultural depressions are designated on this map.

Generalized Profile Description

Initial observation of the exposed profiles at the site indicated that extensive disturbance had occurred. However, from the sample of available profiles, it was possible to establish a generalized stratigraphic sequence for the entire project area. A representative profile description

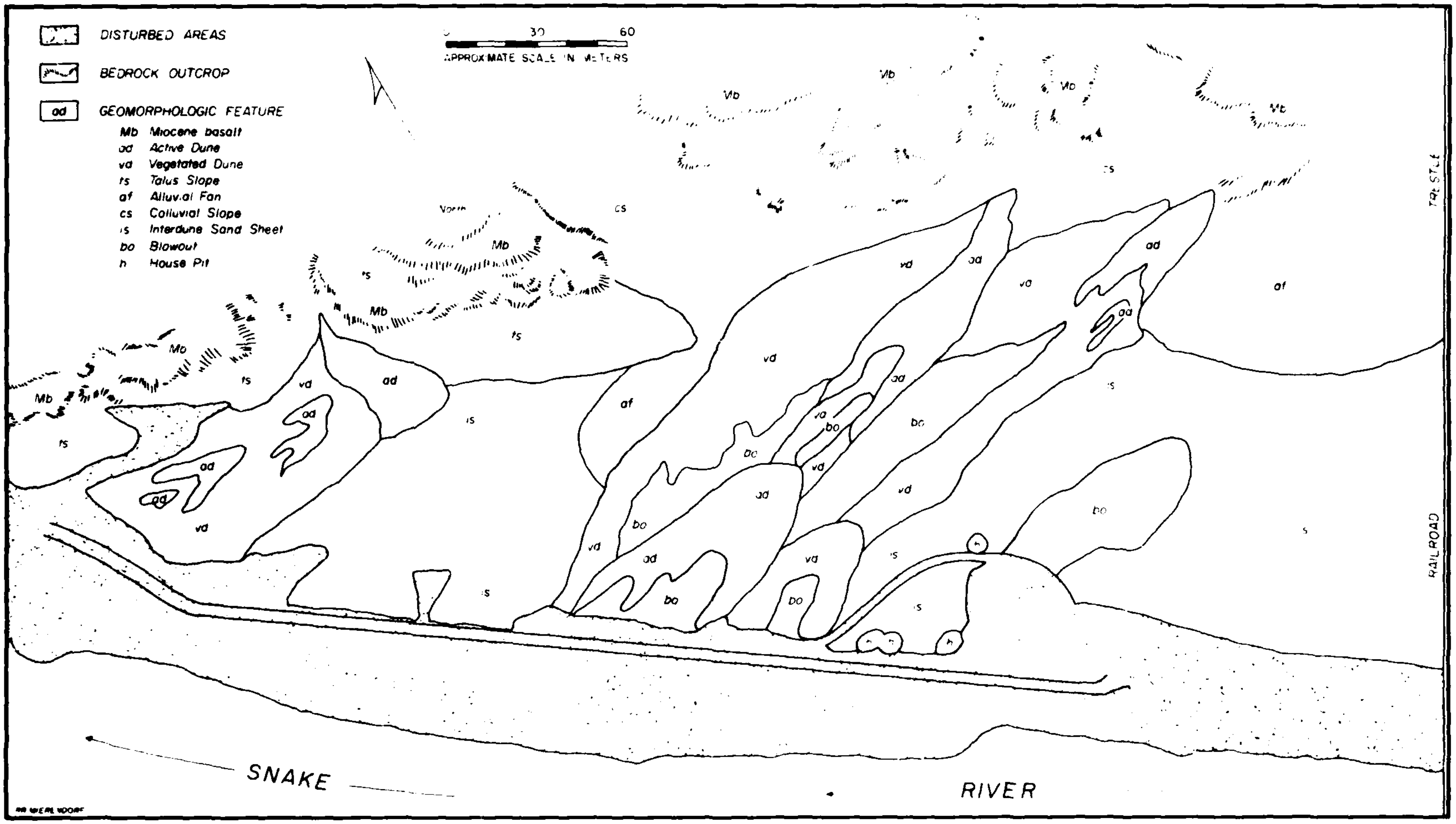

Figure 19. Planview map of geomorphic features at 45FR36 and vicinity.

of this sequence follows. Descriptive terminology generally conforms with the conventions expressed in the Revised Soil Survey Manual (Soil Survey Staff 1975). Figure 20 is a schematic diagram of the profile.

Depth (cm)	Geologic Unit	Description
0-23	Aeolian sand (Ah horizon)	Very dark gray brown (10YR 3/2.5m) very fine sandy loam; moderate, very coarse parting to very fine plates; slightly hard, friable, nonsticky and nonplastic; abrupt, smooth boundary. Note: some plates are separated by thin (<5 mm) dry grass mats.
23-60	Aeolian sand (Bs horizon)	Dark brown (10YR 3/3m) silt loam; weak, very coarse prisms parting to medium angular blocky; hard, friable, slightly sticky, low plasticity; clear, smooth boundary. Note: the planes bounding the large prisms are probably drying cracks; no silt or clay skins were observed on these surfaces.
60-83	Aeolian sand? (buried Btca horizon)	Dark brown (10YR 3/3m) silt loam; coarse to medium angular blocky; mottled with a continuous network of many, distinct, fine, pale brown (10YR 6/3m) filaments of carbonate efflorescence along old root channels; hard to very hard, slightly sticky, low plasticity; weakly cemented; clear, smooth boundary. Note: in some locations the upper portion of the soil horizon shows evidence of disturbance, peds are displaced and loose sand has filled interped spaces; some peds have been rounded; others show a weak, concentric layering in cross-section.
83-97	Slackwater sediments	Gray brown (10YR 5/2.5m) silt; weak, very fine plates; mottled with many distinct, fine, pale brown (10YR 6/3m) horizontal laminae of carbonate efflorescence; hard, friable, slightly sticky, low plasticity; weakly cemented; abrupt, smooth boundary. Note: some portions of the unit are cemented to the point of being brittle; the plates are depositional laminae; in some locations are thin lenses of well-sorted, medium sand between laminae; many filled root casts.

Depth (cm)	Geologic Unit	Description
97-109	Slackwater sediments	Dark gray brown (10YR 5/2.5m) silt loam; soft, friable, slightly sticky, low plasticity; abrupt, smooth to wavy boundary.
109-120	Slackwater sediments	Brown (10YR 5/3m) silty clay; weak, very thin plates; mottled with many distinct, fine, pale brown (10YR 6/3m) horizontal laminae of carbonate efflorescence forming a continuous network which dominates the darker matrix; very hard, friable, sticky, moderately plastic; weakly cemented; abrupt, smooth boundary. Note: more cemented with carbonates than the 83-97 cm unit; the plates are depositional laminae; many filled root casts.
120-145	Slackwater sediments	Dark brown (10YR 3/3m) very fine sand; massive; soft, friable, nonsticky and nonplastic; abrupt, smooth boundary.
145+	Gravels	Subrounded to subangular gravels with an interstitial matrix of loose, very fine sand.

Correlation of Stratigraphy With Previous Geological Studies

Archaeological interest in the Snake River has resulted in a number of studies of the post-Pleistocene and late-Pleistocene geological sequence (Foley 1977; Fryxell 1963; Hammatt 1977; Leonhardy et al. 1971; and Marshall 1971). As a consequence, alluvial chronologies for the lower Snake River region have been established. Marshall (1971) developed an alluvial chronology for the lower Palouse River canyon, immediately adjacent to the project area. The brief summary that follows draws largely from this study.

During the end of the last major Wisconsin glaciation, catastrophic flood waters deposited coarse boulder gravels within the Snake and Palouse River canyons. Subsequently, slack water or "lacustrine"

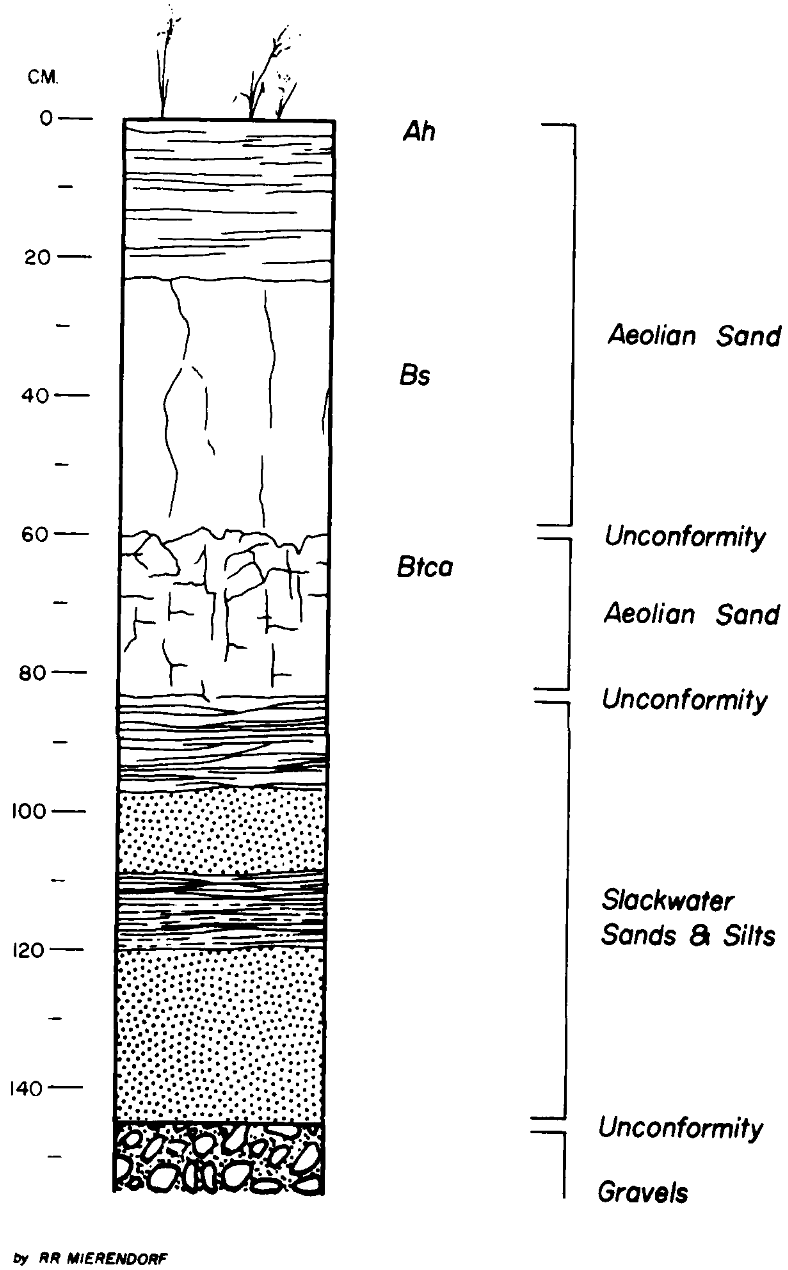

Figure 20. Schematic diagram of the typical undisturbed stratigraphic section.

conditions, also related to flood waters, deposited fine sediments within the river valleys. Glacier Peak ash from an eruption 12,000 to 13,000 B.P. was deposited in the upper portion of these fine sediments (Foley 1976; Hammatt 1977; also, see Carson, McKhann, and Pizey 1971 for a summary of discussion of the meaning of these sediments). Slackwater sedimentation was followed by rockfall; colluvial, alluvial, and aeolian deposition; and the building of floodplain terraces. There ensued a period of decreased river discharge and stabilization, with soil formation on terrace deposits. A layer of volcanic ash from the eruption of Mt. Mazama about 6,700 BP provides a chronological marker that overlies this soil. Terrace formation continued with increased discharges after this time, and was again followed by formation of another soil. Gradual reduction in river discharge continued until the modern rate was reached.

In his study of stratigraphy within the Lower Granite Reservoir area, Hammatt (1977) inferred two alluvial cycles followed by stabilization and soil development. The first occurred between 8,000 and 6,700 B.P. and the second between 2,500 and 1,000 B.P. (Hammatt 1977:119). This sequence generally applies to other portions of the Snake River valley (Hammatt 1977:161-162).

Using the results from Marshall (1971) and Hammatt (1977) the Quaternary geological sequence for the project area is inferred, beginning with the lowest geological unit and moving upward.

A gravel deposit underlies all portions of the project area (U.S. Army, Corps of Engineers n.d.). Test trenches exposed only the upper surface of this unit; however, from observations of this surface along with logs of drill holes (U.S. Army Corps of Engineers n.d.) it is believed that this unit corresponds with the poorly sorted, late Wisconsin boulder

gravel described by Marshall (1971). Overlying this deposit is a medium bedded silty to sandy unit that correlates with the "lacustrine" or slack water sediments reported for the Snake River canyon (Foley 1976; Hammatt 1977) and the Palouse Canyon (Marshall 1971). An unconformity separates this from the overlying unit, which is probably aeolian in origin, but this is uncertain. The most significant characteristic of this aeolian unit is the presence of a moderately well developed structural and textural B horizon. The next and most recent unit inconformably overlies the buried soil B horizon. It consists of aeolian sand in which the weak, modern soil has developed. The geomorphic features mapped as vegetated and active dunes have formed in the uppermost portion of this unit. This unit closely resembles the Aeolian Sands I and II reported by Hammatt (1977:90-94). Hammatt bracketed the age of these units between 2,500 B.P. and the present. Cultural remains from the project area have been recovered only from this uppermost unit.

Discussion

The preceding description and correlation raise a number of points that warrant clarification. These are discussed below.

One of the dominant features of the stratigraphic profile is the presence of the buried soil B horizon; however, correlation with buried soils reported by Hammatt (1977) and Marshall (1971) is inconclusive. Perhaps the absence of Mazama ash is significant. If this soil had formed prior to the deposition of Mazama ash, then it would be likely that burrowing rodents would have subsequently mixed ash into this soil. Ash-filled krotovinas have been observed in pre-ash river alluvium along the Snake River (e.g., Leonhardy 1970:234; Leonhardy et al. 1971:31); however,

no ash-filled krotovinas were observed in the project area. From this it can be inferred that the B horizon is younger than 6,700 B.P. and correlates with the soil developed on the middle alluvium (Hammatt 1977). On the other hand, the evidence for disturbance of the upper portion of the soil horizon noted in the profile description is similar to the occurrence of ped fragments in the pre-Mazama soil reported by Leonhardy (1970:76). Comparison of profile characteristics with those described in Marshall (1971), Hammatt (1977), and Leonhardy (1970) is inconclusive since the range of properties of the pre-Mazama and post-Mazama soils overlaps.

Another problem relates to the identification of the slack water unit. Within the project area, this unit is relatively thin; it shows evidence of disturbance and penetration by plant roots and it is weakly cemented with moderate accumulations of carbonate salts. These post-depositional alterations may have masked a number of properties described elsewhere for this unit but which were not observed within the project area. These properties include the presence of graded beds, microfaulting, and clastic dikes (Hammatt 1977:59). If the slack water assignment is correct, this correlates with the basal stratum above which the early cultural remains were found at the Marmes Rockshelter (Gustafson 1972:51; Fryxell et al. 1968:511). Recent evidence is used to infer an age of about 13,000 B.P. for this unit (Hammatt 1977; Mullineux et al. 1978; Foley 1976). This unit thus represents the lowest expected occurrence of cultural remains in the geologic profile.

On the basis of stratigraphic evidence, the housepits appear to be relatively recent. Since the sample of housepit stratigraphy exposed is small, this conclusion is tentative; however, observations support this conclusion. For example, no buried soils had formed within the

house fill. Rather, the housepits appeared to abruptly truncate the buried B soil horizon. If this soil is pre-Mazama in origin, a lower limiting date for the houses is 6,700 B.P. If this is the post-Mazama soil dated by Hammatt (1979), a lower limiting date for the houses is 2,500 B.P.

Finally, an important geological process within the project area is the transport and deposition of sediments by wind. This results from the direct exposure of the site to prevalent westerly winds which travel up the Snake River canyon unhindered at this point by bends in the river or other natural features. The constant direction and force of the wind are apparent in the pattern and distribution of dunes (see Figure 1). Numerous disconformities noted in the geological sequence are further evidence for the significance of this process to the geological history of the area (see Figure 2). It is probable that as river discharge gradually decreased in post-Pleistocene times, riverine deposits such as channel bar and point bar sediments became exposed to wind action. Since this time, the project area was likely subject to a sequence of aeolian sand deposition followed by deflation as sand dunes migrated in a downwind direction. In such cases, the depth of deflation is usually controlled by the level of the water table and the saturated sediments above it. In this particular location, the slack water silts are more compact than other stratigraphic units and have a higher moisture holding capacity. The top of this unit is thus the lower limit of deflation.

In a previous archaeological test at this site, Wessen (1978: Table 2) noted the possible occurrence of Mazama ash. In the test units excavated by the project being reported here, no evidence for the presence of volcanic ash was observed. However, due to its higher color

value and silt textural class, the uppermost slack water silt was considered a possible ash-rich unit. A sample from this unit was examined under a petrograph microscope. The sample consisted entirely of crystalline detrital fragments; no glass shards were observed.

Summary and Conclusions

Sediments within the project area range from late Pleistocene to Recent in age. Cultural features and artifacts are confined to the uppermost geologic stratum consisting of aeolian sands. Through correlation with similarly described and dated sediments from the Snake River valley (Hammatt 1977), this unit is roughly dated as later than 2,500 B.P. and as recent as the historic period.

Recommendations

Stratigraphic and geomorphic data from the project area indicate that wind erosion and deposition are active processes. Any ground-disturbing activities that involve removal of existing vegetation and exposure of dry sediments to wind action may result in initiation of a local episode of dune building or deflation. Recent experiences should serve as a lesson. Marshall (1971:34) noted reactivation of dune activity related to construction of the railroad trestle across the Snake River, just upstream from the project area. Fryxell (1962:7) commented on disturbance of the Palus Village site caused by development of a blowout also related to construction of the railroad trestle. Care should be taken so that upon termination of construction activities, the remaining ground surface within the project area is stabilized.

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CHAPTER VII

ARCHAEOLOGICAL TESTING OF THE PREHISTORIC SITE AT LYONS FERRY

by

Randall F. Schalk

The field collection of information on the aboriginal archaeological remains within the project area involved (1) contour mapping of that portion of the site containing surficially visible structural remains (depressions), (2) backhoe tests to determine the extent of the site and possible variations in content across it, and (3) hand-excavated test pits in depressions and a few other selected areas of the site. These activities were carried out after a thorough survey of the 67 acres of the project area. Though numerous historic features and debris concentrations were revealed, the survey produced little new information about the prehistoric remains. In fact, concentrations of flakes and bone fragments noted by Wesson (1978) over the upriver portion of the project area in January of 1978 were not visible in June of 1980. A slight decrease in surface visibility would undoubtedly have resulted from the difference in vegetation between winter and summer and also from the light dusting of volcanic ash from the May 18th eruption of Mt. St. Helens.

In that area of the site where Wesson (1978) had reported five possible housepits, careful examination revealed evidence for at least eight possible depressions. In the vicinity of the depression cluster, a number of flakes and large bone fragments were scattered about an area that had been disturbed by a backhoe pit excavated by the Corps during a subsurface geological test of the entire terrace below the Joso trestle.[1]

Two of these depressions were the most imposing that we had ever seen. They were exceptionally large (more than 12 m in diameter) and deep (see Figures 21, 22), and also had low breaks in the river side of their rims that were suggestive of entrance ways. Scattered about these two large and pronounced depressions were six other depressions which were all shallower though two of these seemed nearly as large in diameter. All of these depressions were assigned numbers and the entire cluster was contour mapped with transit and stadia. The resultant map is shown in Figure 23 and the depressions are hereafter referred to by numbers shown.

Another unusual quality of these apparent housepits was their location well above the pre-reservoir river channel. Most housepit sites in the Southern Plateau were located so close to the normal river level that nearly all have been inundated except perhaps in the very upper reaches of reservoirs. When excavated, pithouse sites often show evidence of having been covered by exceptional floods (50 to 100 year? - Mierendorf 1978). Inasmuch as the site seemed unusual in several respects, our initial thoughts were that these depressions might represent aboriginal pithouses that had been substantially "renovated" by railroad construction workers or by historic Indians. Both groups of people were known to have been present in the immediate vicinity, and it is obvious that modification of a pre-existing hole in the ground would require less effort than digging one from scratch. On the basis of heresay information at least for the Umatilla area, Chinese laborers lived in subterranean dwellings along the river banks. The conjecture that some historic modification of these depressions had occurred was at least partially encouraged by the presence of historic debris and what seemed to be a stone-lined

Figure 21. Housepit 2

Figure 22. Housepit 3

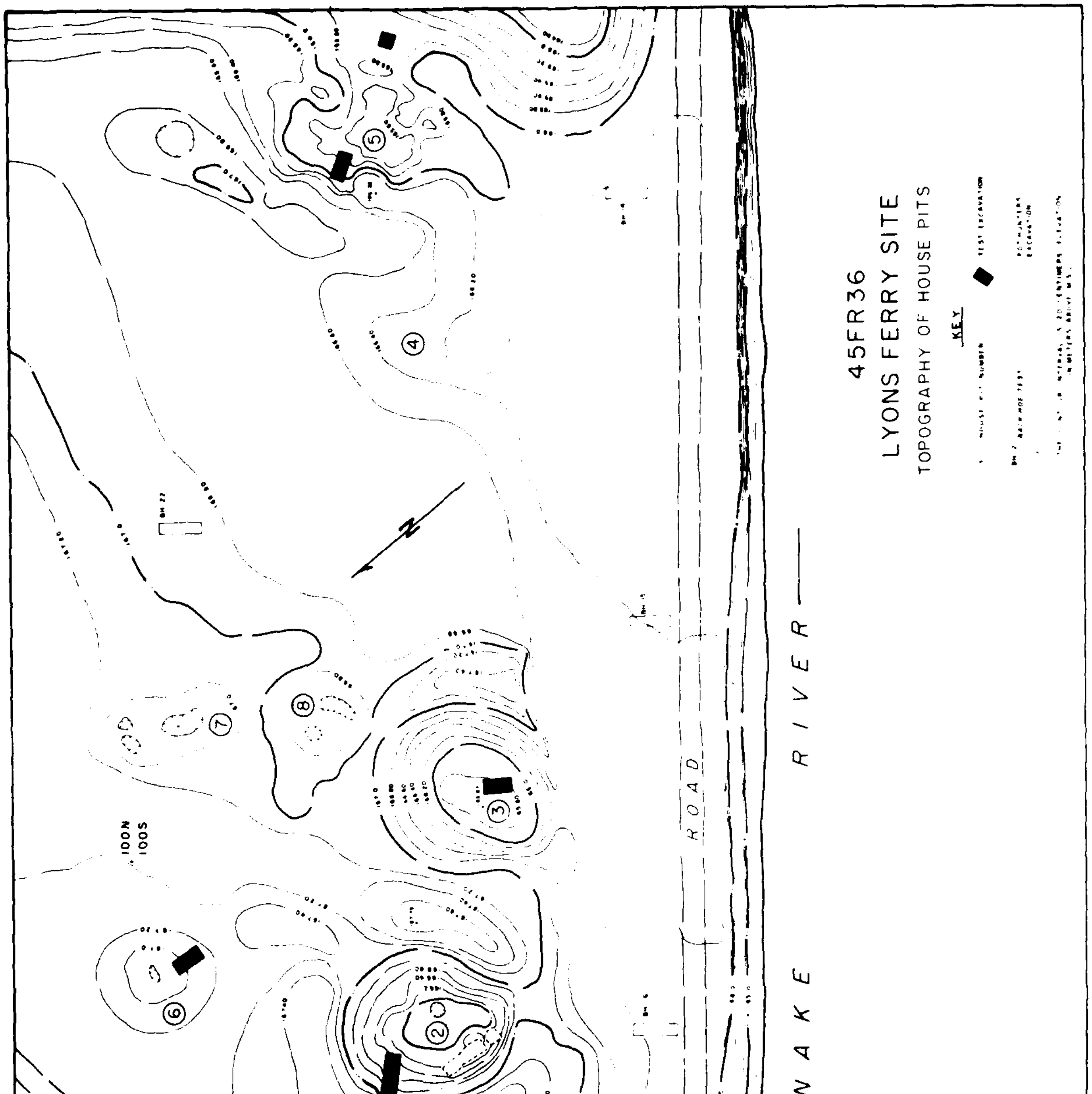
45FR36
LYONS FERRY SITE
TOPOGRAPHY OF HOUSE PITS
KEY
SNAKE RIVER
ROAD
ROAD
100N
100S
100N
70E
100N
50E
1
2
3
4
5
6
7
8

Figure 23.

entrance in depression #5. It might also be mentioned that one of Wesson's test pits which was excavated into an unspecified depression, produced metal, glass, leather, and porcelain to a depth of 40 centimeters where excavation was terminated. Upon completion of our own subsurface tests into four of these depressions, our initial conjecture about them proved, for the most part, wrong.

In the following sections, the various subsurface tests and the information recovered are discussed.

Testing Procedures

The subsurface testing procedures employed were modified from those that we had employed in a previous testing project at Umatilla, Oregon. The use of a backhoe for site testing developed out of a dissatisfaction with the kinds of information that have so often been recovered in the testing of large, frequently deep floodplain sites in the Plateau. One or a few 1 x 1 or 1 x 2 pits are ordinarily selected for hand-excavation, and the findings from these are then generalized to the entire site--the boundaries of which are not often defined in any adequate way. The amount of earth that can be moved and the size of sample recovered in such tests are generally so small as to be of dubious utility for much of what archaeologists need to know for modern research purposes. In particular, adequate sampling designs in any subsequent excavations on a site require information on the relative densities of artifacts and debris within the site so that (1) adequate volumes of excavation may be planned to meet minimal sample size requirements for tools, faunal remains, or lithic debitage or whatever, (2) adequate time and resources can be allotted to the excavation of deposits of a given artifact and

debris density, (3) ample time and resources can be committed to laboratory processing and analysis, (4) planning decisions can be made about appropriate ways of recovering data pertaining to site structure and intrasite spatial organization without resorting to testing procedures that are very costly and/or destructive to the site deposits. Systematically placed backhoe pits permit the rapid recovery of information pertaining to density, intra-site variations in small cultural items, reveal better stratigraphic profiles, and probably are at least slightly superior to the 1m x 1m "telephone booth" in identifying features.

The testing procedure involved two principle techniques: (1) systematically placed backhoe test pits spaced at 30-50 meter intervals, and (2) hand excavated test pits of variable dimensions placed in purposefully selected locations. The backhoe tests were intended to give rapid information about the horizontal and vertical extent of the aboriginal site and identify the major patterns of intra-site density variations. Though small dispersed samples cannot realistically recover large enough numbers of cultural items to adequately deal with questions of intra-site activity areas, horizontal stratification of a site can often be recognized from the recovery of diagnostic artifact varieties. Once the general nature and extent of the subsurface deposits had been established, the next stage involved a finer-grained hand excavation of test pits to recover information about specific features or locations within the larger site. In particular, the surficially visible housepit depressions were deemed too fragile to be approached with the backhoe, and so its use was limited to those areas of the site lacking visible surface features.

A series of backhoe test locations (BH 1-13) were chained in along the river front of the project area starting from the upriver end near the railroad trestle (see Figure 24). Two main rows were staked upstream from

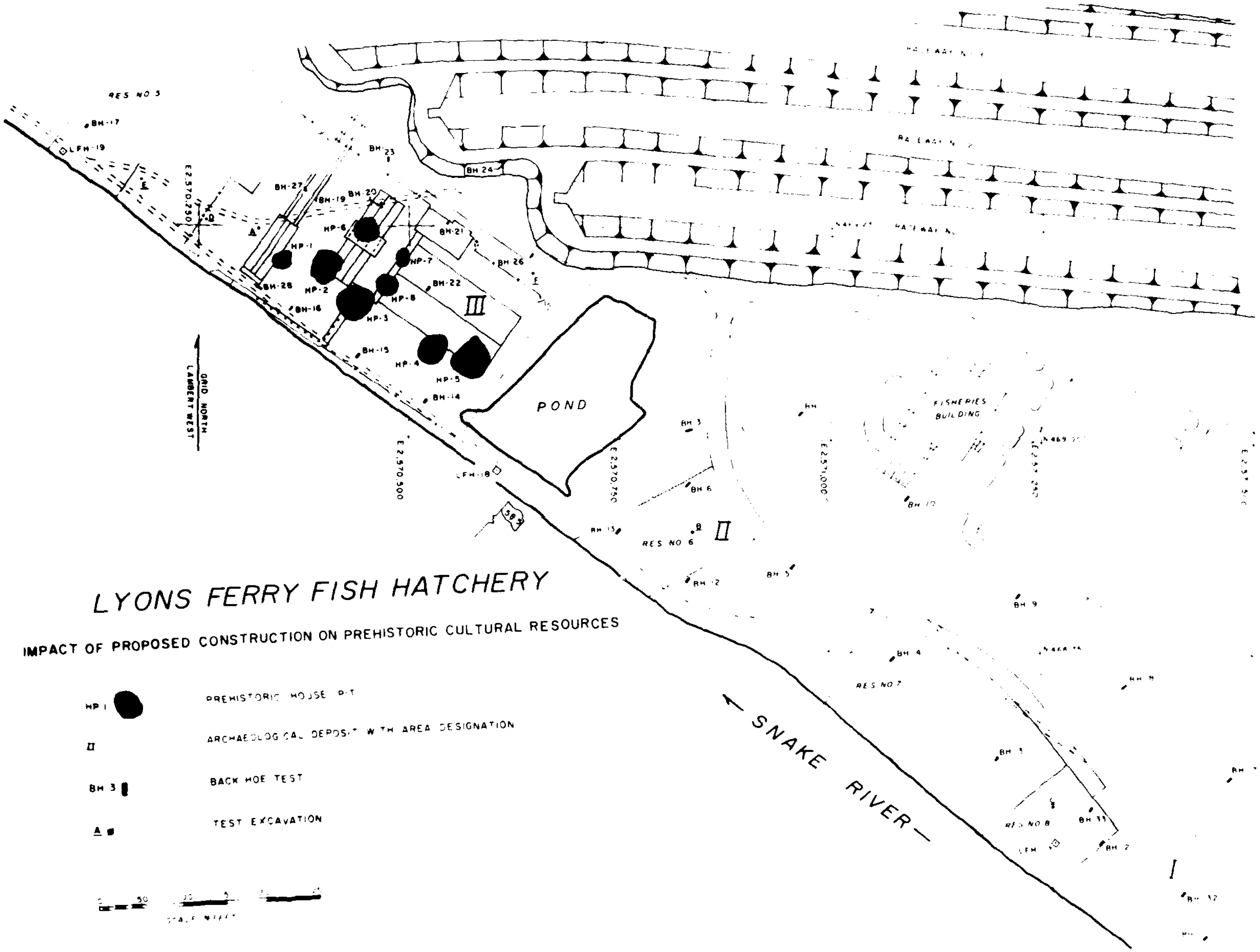

Figure 24. Map of test pit locations and prehistoric archaeological deposits.

the borrow pond; below the pond, a single row of test pits (14-18) was placed in front of the housepits and immediately adjacent to the roadbed that forms the river bank along this portion of the project area. Other backhoe pits (19-27) were placed across the backside of the depression cluster to delimit the extent of the deposits in that area. Still other backhoe pits were excavated to recover information from specific locations within the site. BH-31 and 28 were cutbank faces where earthmoving equipment had previously exposed sediment profiles and the backhoe was used to face these off so that a clean vertical stratigraphic profile could be examined. BH-32 and 33 were excavated in the last two days of the fieldwork to increase the sample of small items from the upriver area of the site where so little had been found and where it was thought that more intensive coverage might reveal a concentration that had been missed in the original tests in this area.

Backhoe test pits were excavated in a uniform and controlled fashion. These pits were about 3 meters in length and the width of the backhoe bucket (60 centimeters). The backhoe operator attempted to remove sediments in 10 centimeter levels. A person with a tape measured the depth of the trench after each bucket of dirt was removed and informed the operator if he had gone a little too deep or not deep enough so that he could adjust accordingly. The buckets of dirt were laid out in a radial pattern around the peripheries of the backhoe trench. Each of these piles could then be sampled by the screening crew working at its own pace. The screening crew screened a constant and measured volume of dirt from each of these piles each of which represented the sediments from a 10 centimeter level. This was accomplished by shoveling dirt from each pile into a wheelbarrow up to a line marked around the inside at a little over the

half-full level. This volume amounted to 0.049 m^3 or approximately half the volume of a 10 centimeter level in a 1m x 1m test pit. Backhoe tests were excavated down into the gravels except in the northwest part of the project area where these occur at depths greater than the backhoe could reach. As far as could be determined, all backhoe test pits were extended below cultural bearing sediments.

In general then, the completion of the initial stage of testing by means of backhoe and screening, defined the horizontal and vertical limits of the aboriginal remains in the project area.

The primary objective of the hand-excavated tests was to investigate the housepits on the site. In the planning stages of the testing, it was assumed that all of the housepits would probably be destroyed during construction of the hatchery. The hatchery had already been designed and a fish egg removal facility was to be situated directly over the housepit cluster area. The possibility that time and resources would permit complete excavation of all of these housepits in any subsequent mitigation program seemed remote. It was our intention, therefore, to document the content and variability of the housepits so that informed decisions could be made about the appropriate excavation strategy during a major data recovery effort that might follow. Some of the kinds of information which we believed test pits could reasonably be expected to recover from the housepits included (1) the extent to which they contained intact living floors, (2) whether artifact and debris densities were sufficient to offer adequate faunal and lithic samples, (3) the number of distinct occupational episodes as reflected in superimposed floors, and, of course (4) the character of the faunal and lithic contents of the houses.

When it was realized during the field testing that re-designing the hatchery around the housepits was a possibility, attention was re-directed from trying to test each housepit to obtaining slightly larger samples from a few. This shift in the plan for testing the housepits was also conditioned by the fact that a general uniformity in internal structure, content, and age was indicated in the first three housepits that were tested. Test pits were, therefore, excavated in only four housepits; three of these were 1m x 2m in size (H.P. #3, #5, #6) and the fourth was 1m x 5m (H.P. #2). These excavations were located so as to section the edge of the house floor and a portion of the rim. All were excavated down to sterile layers which were either slackwater sediments or, where the housepits had been originally excavated through those, flood gravels (see Mierendorf, Chapter VI). Like the backhoe tests, these test pits were excavated in arbitrary 10 centimeter levels and dirt was screened through 1/4-inch mesh.

Finally, five 1m x 1m tests (A-E) were excavated in various areas of the site lacking surficially visible structural remains. (These are referred to as "test units" in the Appendices.) One of these tests (A) was placed to determine if there were distinguishable living floors in an area in close proximity to but outside of the housepits. Two others (B, C) were excavated in Areas I and II for the same reason and also to increase the limited sample of items from these areas. Weeks after completion of the testing program as it was originally planned, three additional test units (D, E, F) were excavated to recover more detailed information on site boundaries in two areas where more precise information was required to permit re-design of the hatchery to miss as much of the site as possible.

Site Boundaries

Site boundaries were defined by the density of lithic items of human origin--debitage, tools, and fire-cracked rock. A column density of five items was identified as the minimum necessary in a test column that extended to sterile and amounted to the equivalent of a .5m x 1m pit.

The distribution of the prehistoric deposits so defined is shown in Figure 24. There are clearly three concentrations of material between the trestle and the foot of the sand dunes that run along the northwestern margin of the project area. The largest one (Area III) was that which includes the housepits, and it is also characterized by the highest overall density of artifacts and debris. These three areas were probably once part of a continuous archaeological deposit, and the disturbances which resulted in the non-continuous distribution are discussed in a later section on site integrity.

Housepit #2

This very large depression showed evidence of at least three disturbances or potholes in addition to a front rim which had been slightly scraped by the same event that scraped the front rim of housepit #3, and possibly #4 and #5. One of the potholes was roughly 1.5m x 1.5m in extent at the surface and was located in the northern rim extending down towards the depression floor. It was decided that placement of a 1m x 1m test pit at either end of this disturbance along with shoveling out the fill in the disturbed area itself would produce a 5 meter long profile through the high rim of this housepit. This profile, when completely exposed, permitted location of the housepit wall at about 3 meters from the northern end of the trench.

In the southern end of this test pit a hearth was encountered which contained quantities of fire-cracked rock, charcoal, and bone. This feature was located immediately above the sterile slackwater sediments into which the housepit was excavated. A sample of charcoal from the hearth was submitted for radiocarbon age estimation and yielded a date of 2,080 ± 55 B.P. (Beta-1549). This hearth was located near the house wall and probably represents the most recent floor of the house. If there were earlier living floors, they may have been removed when the house was re-excavated. Inasmuch as there are two vertical concentrations of increased lithic debris and faunal remains in the northern (houserim) end of the test pit, it is possible that there was at least one such re-building episode. These concentrations occur between 30 and 50 centimeters below the surface and again between 110 centimeters and 140 centimeters in the two northernmost 1m x 1m units of the trench. Some evidence for a similar pattern was observed in the test pit in housepit #3 as well.

Among the identifiable faunal elements from this test unit was a distal tibia of a bison, an elk antler, and an antler fragment of a deer. Artifacts recovered in this unit included 3 biface fragments, 16 utilized flakes, a "drill," an anvil stone, and a flaked cobble. Lithic debris and unidentifiable faunal items were present in all levels from the upper 10-20 centimeters to the sterile slackwater sediments into which the house was excavated.

Housepit #3

This depression seemed to be quite intact except for the front rim which has been scraped somewhat by the earthmoving associated with

the construction of the road in front of the site. The northern half of the lm x 2m test in this housepit was situated over what appeared to be a slight disturbance that was suspected to be one of Wesson's test pits.[2] Since his excavation had been terminated at a depth of 40 centimeters without reaching the bottom of cultural material, it was hoped that we could come down on level and continue to the bottom of occupation debris. If the attempt proved successful, the test in this depression would cause minimal additional disturbance to what appeared to be the better preserved of the two largest depressions on the site. If not, facing off a clean sediment profile in the house was expected to provide helpful information about the presence or absence of living floors and multiple re-occupation. As it turned out, historic debris (glass, metal, leather, coal) were found in the northern half of the test to a depth of 60 centimeters, suggesting some other disturbance in the form of a pothole. The southern half of this test proved to be undisturbed from the surface down. The gravel layer was encountered at about 60-65 centimeters in both halves of the test pit. Chipping debris and faunal remains were distributed in all levels of both halves of the pit from the surface down. Exceptionally high densities of both occurred in the 15 centimeters of fill above the gravels. Again, this concentration probably represents a house floor, and the dark, organic nature of the sediments supports the same conclusion. A total of 38 stone artifacts were recovered in this test pit and most of these occurred immediately above the gravel layer where lithic debris and faunal items were most abundant. Included among these artifacts were 2 broad based projectile points (see Figure 27 b, c) a point base (Figure 27d), 3 biface fragments, a steep-ended scraper, 3 reworked flakes, 7 exhausted cores whose edges showed evidence of utilization, and 18 utilized flakes. The only identifiable faunal elements

included a shaft fragment of a rabbit (*Lepus*), a proximal femur of a cottontail (*Sylvilagus*), and a vertebra fragment of a salmonid.

In addition to the test pit in this housepit, the bull-dozer truncated eastern rim of the house was troweled off to examine stratigraphy. Though no significant stratification could be detected in this profile, lithic debris appeared to be concentrated in two layers--one near the top of the rim and another close to the surrounding ground level. These concentrations might be interpreted as evidence that the house had undergone at least one major episode of re-excavation.

Housepit #5

Housepit #5, besides having the southern and eastern rims removed during the earthmoving activity documented in Figure 18, also had extensive surficial evidence of historic utilization. These historic remains are apparently associated with the Perry Station House and were discussed in Chapter IV. A 1m x 2m test was excavated in the northern portion of the depression to intersect a portion of both rim and floor. Aboriginal and historic materials were mixed in the upper 50 centimeters of the northern half of the excavation and in the upper 80 centimeters of the southern half. The aboriginal material extended down to a depth of 130 centimeters where the gravel layer was encountered. Although both lithic debris and faunal remains were found in all levels above the gravels, both were of notably greater abundance in levels 9 and 10 in the north half of the excavation and in level 10 in the southern half. This greater concentration of material appears to represent a house floor. A hearth feature indicated by large, charred fragments of wood, fire-cracked rock, and fire-reddened earth was encountered in the northern half of the pit. A sample

of the burned wood from this feature was submitted for radiocarbon dating and yielded an age estimate of 2,435 ± 65 B.P. (Beta-1548). Underlying this probable floor was a stratum of lighter color containing less sand an' more silt which extended down to the gravel layer. Within this stratum and in the southern half of the test pit, a feature containing bone, a large cobble, and a small, stemmed projectile point (illustrated in Figure 27f) was found. The identifiable bones included 1 proximal ulna fragment of a rabbit, and a distal fibula, 7 carpals, a pisiform, proximal metacarpal, and a metacarpal shaft fragment all of bison. Of the 45 unidentifiable bone fragments found associated with this feature, 36 seem to be from an animal of bison size. This feature probably represents an earlier occupation in the house than the one indicated by the dated hearth. Artifacts found from all levels of this test included the above mentioned projectile point, a point stem, a point base, 2 biface fragments, and 6 utilized flakes.

Housepit #6

This depression situated behind housepits #2 and #3 is less pronounced and smaller (see Figure 23). A 1m x 2m excavation was located to intersect the southern portion of the floor and rim. Although a few historic items (small cans) were present on the surface in the bottom of the depression, there was no surficial evidence for disturbance to this housepit. Lithic debitage and faunal remains were present between 20 and 130 centimeters depth with somewhat higher frequencies in levels 7-10. The only identifiable faunal element found in this test was an elk antler fragment. Artifacts found included 1 broad projectile point stem, a biface fragment, 2 steep-ended scrapers, a reworked flake, and 4 utilized flakes. The housepit wall was quite clearly visible due to organic staining,

charcoal and fire-cracked rock which were all present in housefill encountered between 45 and 90 centimeters depth in the north half of the excavation. This wall was steep-sided with an angle of roughly 45 degrees from the floor.

Other Test Pits

Those hand-excavated 1m x 1m tests not located in housepits have been designated with letters (A through E). These units were excavated for at least three different reasons. Test unit A was excavated in the vicinity of the housepits to determine if any vertical concentrations of artifacts and debris or living surfaces could be detected that would not adequately be evidenced in the typically complex deposits in houses or that would not have been reflected in the backhoe tests due to insufficient control. This effort seemed appropriate insofar as two housepit rims (housepits #2, #3) seemed to have two layers of significantly higher densities of lithic and faunal debris. Test unit A, however, did not satisfactorily answer this question. Faunal items were most abundant in levels 2 through 6 and present in very limited numbers in levels 7 through 13. Lithic debris, on the other hand, was present in limited quantities in levels 3 through 6 and in notably greater quantities in levels 10 through 13. This inverse relationship in the vertical distribution of the faunal and lithic debris in this test pit may be simply the product of sampling error or some unknown intra-site activity patterning that we don't understand. In any case, no discrete and pronounced living surfaces were identified either in this test unit or in the backhoe tests around the peripheries of the housepit cluster. Cultural debris appears to be dispersed throughout the upper 130 to 150 centimeters of sediments in all the tests outside of houses in this area of the site.

Test units D, E, and F were excavated two weeks after the completion of the original testing operation at the request of the Corps. In discussing the possibilities for re-designing the hatchery around the housepit portion of the site, the western end of the site downstream of housepit #1 (see Figure 24) came under closer scrutiny as an alternative location for the fish egg removal facility which was originally designed to be directly over the housepit cluster. It was apparent that our information about this portion of the site came exclusively from a single backhoe pit (BH-17) which was nearly sterile. Test unit E consisted of very few faunal items (3 unidentifiable elements) in an excavation to sterile deposts at 130 centimeters. Lithic debris, on the other hand, was fairly abundant (80 items). Test unit D produced the greatest number of faunal items of any 1 meter unit excavated on the site (3,511). The bulk of these occurred in a feature almost exclusively comprised by bone with a few fire-cracked rocks and flakes. This feature occurred in levels 6-8 in the northwest corner of the pit and probably represents a bone dump where the wastes from bone grease processing were discarded. Lithic debris and faunal items continued in the levels below this feature to a depth of 150 centimeters where excavation was terminated without reaching sterile sediments.

Test unit E was also excavated to satisfy information requirements of the Corps. The back edge of the site was of critical importance because a minimum clearance was required for a road along the edge of the raceways. Test unit F was placed to get artifact/debris density information. A total of 18 items including lithic debris, fire-cracked rock, and mussel shell were dispersed through the upper meter of deposits.

The Faunal Assemblage

The observations presented here regarding the sample of faunal remains from Lyons Ferry are based upon comparisons with faunal remains from other sites with which we have first-hand familiarity and for which there is comparable information. In particular, the Lyons Ferry fauna are contrasted with those from Strawberry Island (45FR5) and the housepit component (B) at Umatilla (35UM1) (Schalk 1980). These two other sites are of interest because both are housepit sites with extensive occupations that date largely to the last 1,500-2,000 years. The samples referred to here from both sites, in fact, date largely to the last few centuries of the prehistoric period. Reference to these other faunal assemblages provides a sort of coordinate system within which differences in the relative frequencies of various classes of faunal items in the Lyons Ferry assemblage take on significance. The value of such a comparison between housepit sites of different age is that assemblage content may be examined with an eye towards the question of culture change during the period post-dating the beginnings of winter sedentism.

Only a small number of faunal items were identified to the genus level. A total of 62 elements were identifiable to this degree, and this number represents 0.8 percent of the total number of faunal items recovered in the sample (8,085). Of the small number of specimens identified in this way, only 41 are likely to represent fauna that were consumed as a food resource. Some elements must be omitted from consideration as economically exploited species because there was no evidence that these were actually consumed. Specifically, the small rodents (*Thomomys*, *Microtus*, and *Citellus*) all appeared to have been intrusive into the deposits due to their burrowing habits. These specimens are, however, tabulated along

with those that were exploited as food resources in Appendices A-C. Included in these appendices are tables of items identifiable to the genus level, of items which can be assigned to more gross size and taxonomic classes, and of items that were separated into various breakage categories.

Large mammals constitute 75 percent of the 41 economic faunal items identified to the genus level. In particular, bison amount to 62.5 percent and elk to 12.5 percent. Cottontail rabbits amount to 7.5 percent of the items identified to the genus level, and all other genuses are represented 5 percent or less. A histogram showing percentages of the various categories of items identified to this level for this small sample is shown in Figure 25. Similar histograms are presented in the same figure for Strawberry Island and Umatilla.

There are some obvious and rather dramatic differences between Lyons Ferry and these other two assemblages. A major contrast is that the large mammal categories, bison and elk, are quite rare or altogether absent in both Strawberry Island and Umatilla collections whereas the same large mammals dominate the sample of identifiable elements in the Lyons Ferry assemblage. While jackrabbit and salmonids are the two most abundant categories at Strawberry Island and Umatilla, these both amount to only 5 percent of the items identified to genus at Lyons Ferry. Though not central to the discussion here, it is an interesting fact that jackrabbit and salmonid occur in very different frequencies in the Umatilla and Strawberry Island collections. This pattern, if it is not the product of sampling error, may be related to minor differences in the relationships of these two sites to loci of fish procurement. Another possibility is that there are temporally distributed differences in subsistence that are not adequately controlled in the composite assemblages from these two

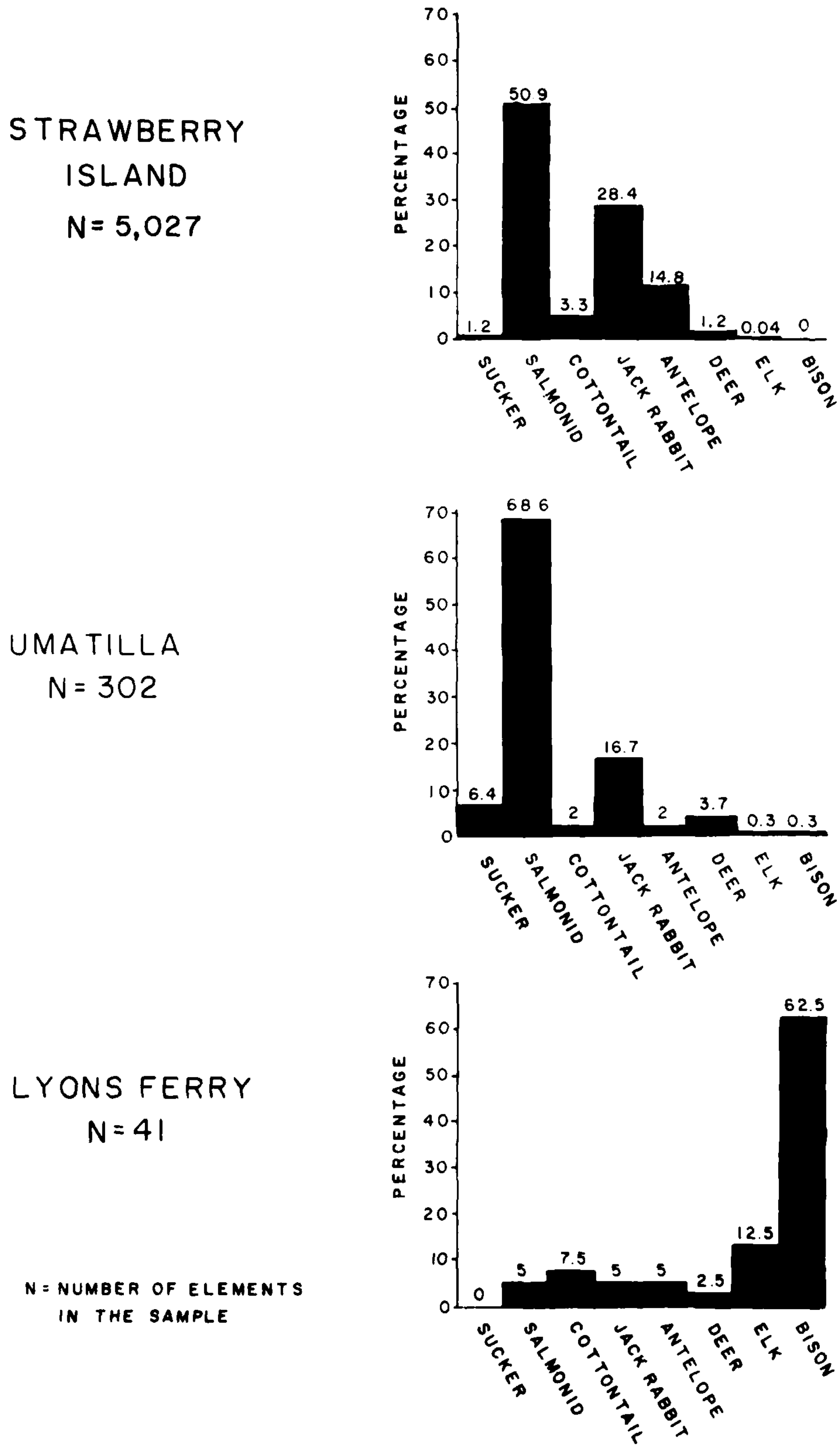

Figure 25. Percentage frequency histograms of faunal items identified to the genus level for three residential sites in the Southern Columbia Plateau.

housepit sites. The substantial differences in frequencies of jackrabbit and salmon at these two sites suggest the difficulties that surround efforts to draw conclusions about subsistence change when we are forced to deal with samples that are either very small or are composites of housepit occupations spanning many centuries. If it were possible to control adequately for sample size differences and possible effects of comparing assemblages of variable grain, we would still not be justified in assuming that relative frequencies of identifiable elements reflect the quantitative importance of different resource species in any direct way. What we can reasonably hope to gain from such comparisons, however, is some idea about <u>trends</u> of changing importance of various resources.

Given the small sample from Lyons Ferry and the suggestive differences in relative frequencies of identified elements evident in Figure 25, it is informative to consider the faunal items that were not identifiable to the genus level but which can be assigned to a less specific category based upon animal size and/or broad taxonomic category. A procedure which provides an independent measure of the relative frequency of various faunal resources was also employed. Faunal items not identifiable to genus were wherever possible assigned to one of five classes following Olson (1980):

(1) large mammal; Faunal items included here are those estimated to be from animals between 500 pounds (adult female elk) to 2,000 pounds (adult male bison). Bison and elk are probably the only species represented in this size category.

(2) medium mammal; Faunal items in this class are those estimated to be from 50 pounds (small female antelope) to 400 pounds (large male deer). In addition to deer and antelope, mountain sheep would fall in this class.

(3) small mammal; faunal items included in this class are those estimated to have a live weight range between 1 pound (ground squirrel) and 60 pounds (large male beaver).

(4) bird

(5) fish

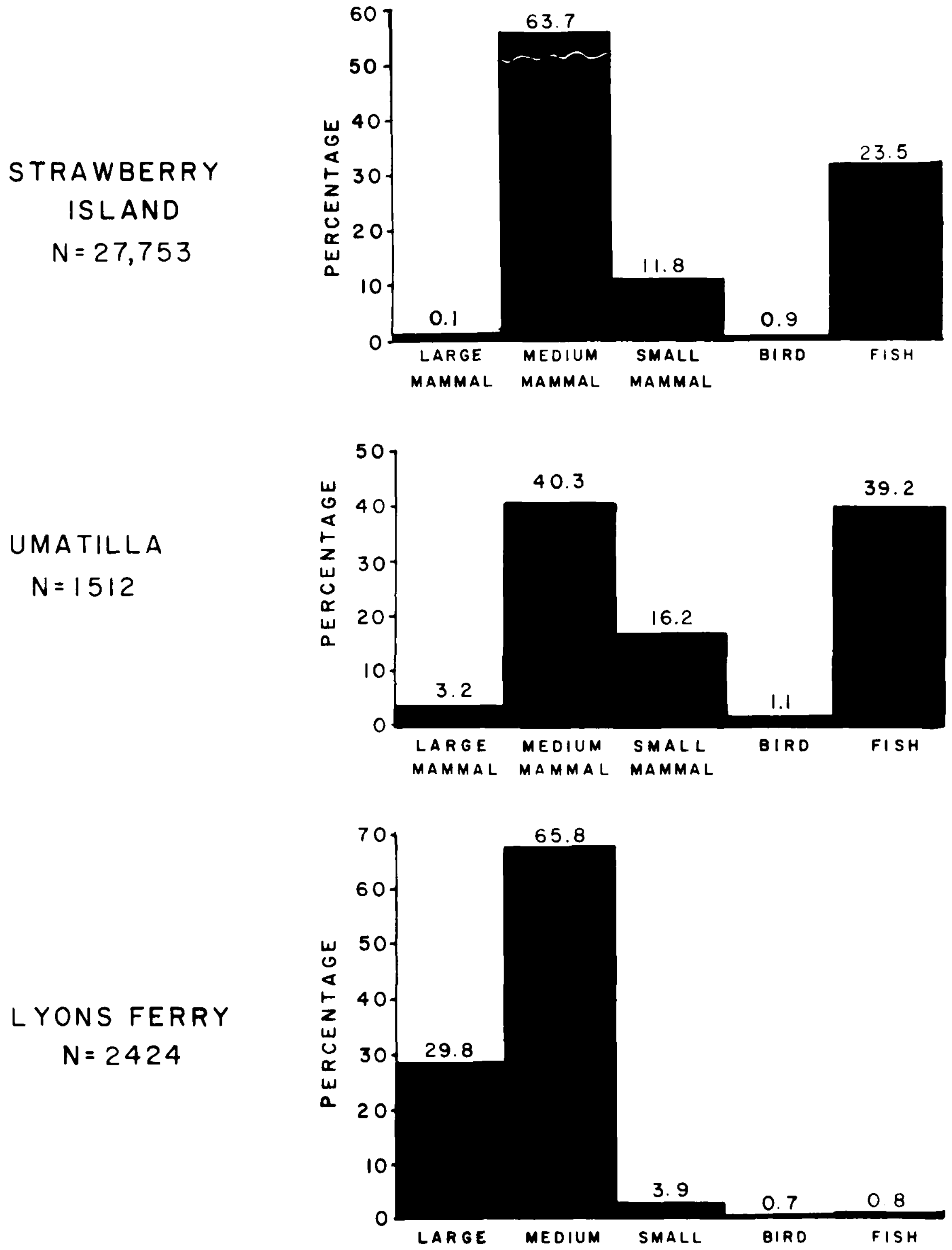

Figure 26. Histograms of faunal elements identifiable only to a size or taxonomic class.

This procedure tremendously increases the size of the useable sample and yields a rather different picture of the relative frequency of various resources. A histogram of faunal items identified in this manner for the same three sites is presented in Figure 26. The most important contrast in this histogram for Lyons Ferry is that the large mammal category which includes bison and elk is eclipsed by the medium mammal category (deer and antelope). When compared to the other two sites, the Lyons Ferry assemblage evidences much higher frequencies of large mammals and medium mammals. On the other hand, small mammals, birds, and fish show no major frequency shift from their frequencies in the genus-level histogram though all are present in very low frequencies (less than 3.9 percent). The conclusion supported by both of these histograms regarding the Lyons Ferry faunal assemblage is that the hunting of ungulates seems to have had a far more important role in subsistence than during the later periods represented by Strawberry Island and Umatilla. These latter two sites evidence substantially higher dependence upon fish (especially salmonids) and small game at either level of identification (compare Figures 25, 26) Inasmuch as the histograms for Strawberry Island and Umatilla illustrated in Figure 26 are remarkably similar and are based upon much larger samples than those in the genus-level histograms, this patterning is likely to be real and significant.

The fact that the medium mammal category for Strawberry Island and Umatilla is greatly increased at the expense of jackrabbit or salmonid respectively may be explained by the extent to which the skeletal remains of ungulates are processed for marrow, bone grease, or bone soup. The epiphysis of long bones which are so often useful in identifying an individual specimen to the genus level are probably systematically destroyed where hunted foods are not plentiful and are consumed immediately

(see Binford 1979:144). It is interesting in this regard, however, that while bison and elk strongly dominate the faunal elements identified to genus in the Lyons Ferry assemblage, the large mammal category is overwhelmed by the medium mammal category in the second level of faunal identification (compare Figures 25 and 26). This would seem to support the possibility that bison and perhaps elk as well were not subjected to the same degree of destruction from processing at the Lyons Ferry site. This possibility, if confirmed in future work, would lend support to an argument that bison and probably elk were introduced at seasons of the year and/or in large enough quantities that their skeletal remains were less intensively processed than were the medium mammals. Another possibility which may not be entirely independent of the preceding one is that bison and elk may have been killed in sufficient quantities to permit caching of meat at considerable distances from the winter village site. Those anatomical parts subsequently retrieved from caches and introduced to this site would not have been suited for marrow and bone grease processing owing to the rapid deterioration of these constituents. In any case, bison and probably elk seem to be better represented in the genus-level identifications than are the medium mammals, and this pattern is deserving of an explanation if it is maintained in more representative samples than the one we are dealing with here. Although Lyons Ferry is located in a slightly more mesic setting than either Strawberry Island or Umatilla, it does not seem likely that the small differences in average annual precipitation could account for the magnitude of differences in resource species that are indicated.

Before proceeding to a discussion of the lithics, an additional observation is in order regarding the degree of identifiability of these

and other faunal assemblages. It was mentioned earlier that only 0.8 percent of the total faunal items from Lyons Ferry could be identified to the genus level. This does not compare favorably with the percentages of identifiable items from Strawberry Island or Umatilla even though the same individual (Deborah Olson) analyzed all these assemblages. The percentage of identifiable elements at Strawberry Island was 9.2 percent and at Umatilla 15.9 percent. At another site in the Palouse drainage, Cow Creek Rockshelter, the investigators achieved a remarkable 28.5 percent identified <u>at least</u> to the genus level (Deaver and Greene 1978). It is perhaps significant that this rockshelter is dominated by small mammals, especially ground squirrel and cottontail. Ungulate remains constitute only 570 of the 4,473 identified elements. The conclusion which emerges from these examples is that the degree of identifiability to the genus level is inversely proportional to the size of the fauna represented. There would appear to be progressively higher degrees of identifiability where smaller animals constitute greater proportions of the total faunal sample. This is almost certainly explainable as a function of the destructive processing of the larger resource species, but the subject is worthy of much additional consideration.

The Lithic Assemblage

The discussion of lithics here will be appropriately brief in accordance with the small sample of artifacts that were recovered and our present inability to attach behavioral meaning to much of the patterning in lithic assemblages even in statistically reliable samples. The observations made here are largely impressions that derive from comparisons of the Lyons Ferry lithics with those from other sites with which we are familiar and for which there is comparable information. Here again, the

Lyons Ferry samples are contrasted with those from Strawberry Island and Umatilla. Data on the frequency of artifacts by rough categories, as well as debitage frequencies, are tabulated by excavation unit and level, and presented in Appendices E and F.

One of the characteristics of the Lyons Ferry lithics which became readily apparent in the early days of testing the site was that there was a relatively low artifact to debitage ratio. That is, flaked stone items that showed evidence of some use even if no deliberate modification was apparent were relatively scarce in proportion to the quantity of debitage. If the number of tools is compared to the number of items of flaking debris for the entire sample recovered in testing the site, a ratio of 1:25.8 is obtained. This ratio is quite low when compared to the same ratio for Strawberry Island which is 1:11.8 and to the pithouse component at Umatilla which has a ratio of 1:7.7 (Schalk 1980). One possibility that would account for a low artifact to debitage ratio would be that the initial stages of core reduction took place more often on the site than elsewhere thereby producing greater quantities of debitage. If this were the case, one would expect a higher frequency of decortication flakes in the debitage from this site than from other sites. Examination of the relative frequency of decortication flakes to thinning flakes from several excavation units failed to support this possibility. Approximately 1 decortication flake was found for every 6 thinning flakes, and this is very close to the same ratio for Strawberry Island (unpublished data). A second possibility seems more likely, and that is that a core reduction process was being utilized at Lyons Ferry which simply produced a greater amount of debitage. Indeed the bipolar technique which is so abundantly represented in the lithics from Strawberry Island (Flenniken 1978:107) seems to be a reduction technique that minimizes waste. The general

absence of evidence for this technique at Lyons Ferry suggests the possibility that techniques which were less economical were being utilized. If this tendency eventually proves to be a general one and one which differentiates earlier pithouse assemblages from later ones, then an obvious and interesting question would be what factors might be conditioning the economy with which lithic raw materials are utilized?

Other qualities of the Lyons Ferry lithics which were pronounced enough that they are probably not the product of sampling error are that the frequency of cobble tools seemed relatively low and the frequency of flaked scrapers seemed particularly high when compared to Strawberry Island or Umatilla. Nelson (1973:386) has pointed out that cobble tools, particular "choppers," tend to be among the most common items found in prehistoric sites throughout the southern Plateau yet these were represented by only a single specimen from the Lyons Ferry sample. Steep-ended scrapers and other flaked tools which had been modified to form a stronger and less sharp working edge than is characteristic of a flake were quite common in the sample; these items are, interestingly, quite scarce in the Strawberry Island and Umatilla collections. A better understanding of the determinants of variations in the relative frequencies of various tool forms will probably require covariational studies upon data collected from more intensive excavations than we are dealing with here. In any case, explanation of such differences in tool frequencies has yet to be undertaken in any systematic way in Plateau archaeology and remains a topic for much further attention.

The projectile points from Lyons Ferry are quite distinctive from those typical of sites dating to the last 1,500 years in this area. The most common projectile point form in the Lyons Ferry sample is a short, broad-stemmed variety. Individual specimens and fragments of this form

were found in several areas of the site (H.P. #3, BH-19, and BH-6). These point forms are illustrated in Figure 27 along with other pointed bifaces which may or may not all be projectile points. The interesting fact is that the small, thin-stemmed points which are so typical of sites less than 1,000 years old are represented by only a single specimen from Lyons Ferry (Figure 27f). This specimen was, as mentioned earlier, found in association with a feature in housepit #5 containing bison lower leg bones and was in a thin stratum immediately underlying a hearth that was radiocarbon dated at 2,480 B.P. If we are accurate in the belief that the wide stemmed points were used with atlatls and the thin stems with arrows, then this occurrence suggests not only a fairly early presence of the bow and arrow but also its contemporaneous use with the atlatl. Although the bow and arrow apparently supplants the atlatl quite completely in the late prehistoric period of the Plateau, there is no good reason why both might not have been utilized contemporaneously for an interval. Rather than thinking of the bow and arrow as in some sense superior to the atlatl, it is probably more accurate that both devices have their advantages and disadvantages. In view of the large proportion of large mammals such as bison and elk in the faunal assemblage, we might wonder what relationships would exist between hunting technology, hunting strategy, and prey species.

Before moving on to the general conclusions about the prehistoric deposits at the Lyons Ferry site, one additional comment about the points from this site is in order. Even in this very small sample of possible projectile points which in its totality is shown in Figure 27 a great amount of variation is present. There are, in addition to the broad-stemmed "dart points," small and thin leaf-shaped bifaces, some other

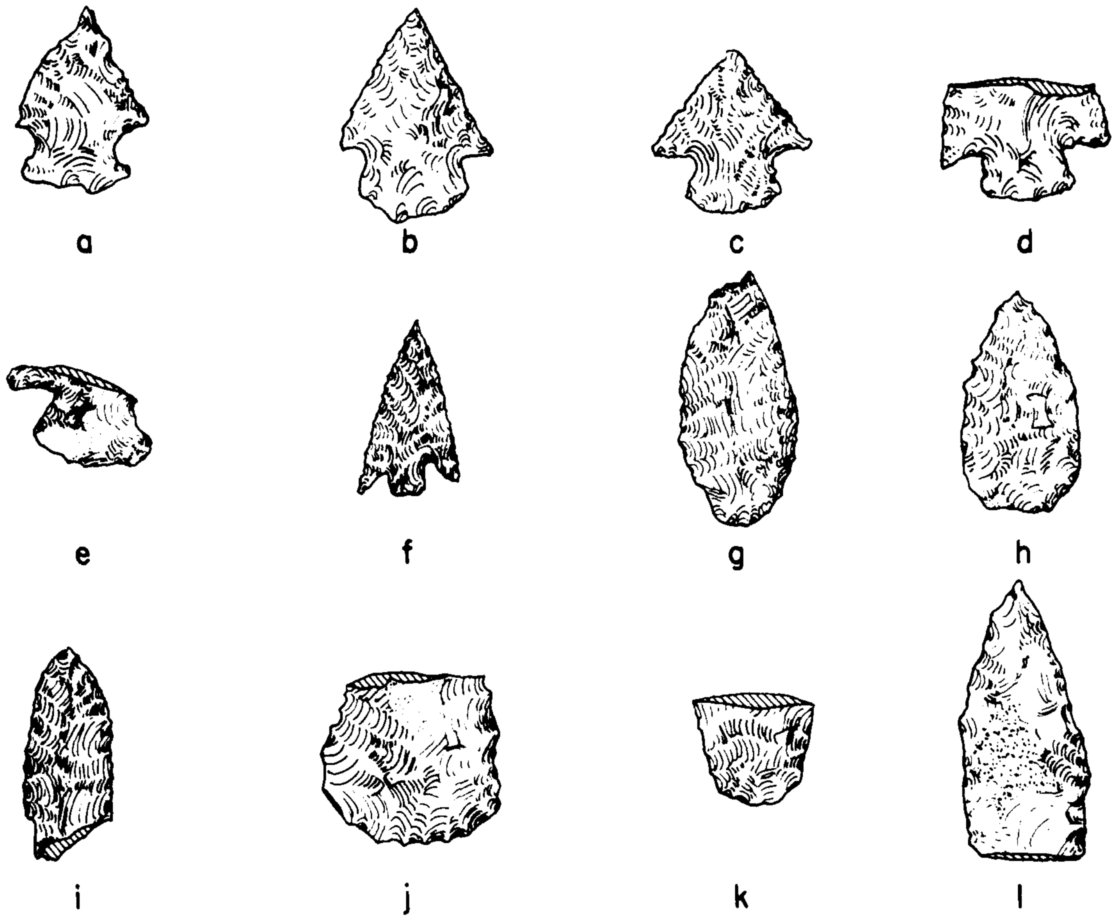

Figure 27. Projectile points and pointed bifaces (drawn at actual size).

"anamolous" forms, and the single narrow-stemmed point assumed to be an arrow point. All of these specimens apparently are associated with the pithouse occupation of the site and no evidence for mixing of stratigraphically discrete assemblages was detected. The fact that these points do not, as a group, correspond well with any of the phase chronologies that have been proposed for the southern Plateau might be taken as support for the view that archaeologists have had a tendency to minimize assemblage variability in their heavy reliance upon "index fossil" artifacts.

Site Integrity

Areas I and II, shown in Figure 24, almost certainly represent remnant deposits of the site that was first recorded in that vicinity by the crew of the Pacific Gas Transmission survey. Mallory (1961:5) described the site as extending for 200 yards along the river front and its long axis was apparently bisected by the trestle abutment. Its width was estimated at 30 yards. A major portion of the site must have been covered with the rising water of the reservoir. The portion which remains above water is the relatively low density, back portion of 45FR36 and the concentrations of mussel shells that were observed in the cutbank of the site in 1960 are no longer present in what remains of the site.

Various earthmoving activities associated with the stabilization of the river bank downstream from the trestle were completed just prior to raising of the pool. This activity was particularly extensive in its impact on Areas I and II and an aerial photo of the area taken in 1969 shows dramatically the nature of this disturbance (see Figure 18). The major disturbances observable on the site today correspond quite closely with those that can be detected on this aerial photograph.

A road was constructed with a gravel base to serve as the bank of the pool across the front of the site. This construction involved a degree of disturbance to the area in front of the housepits and actually sliced through the outer rim of housepits #3, #5, and possibly the other housepits in this row. The borrow pit that is visible in Figure 18 was apparently excavated as a source of fill for the above-mentioned roadbed. An earlier aerial photo of the project area which predates this borrow pit shows a large circular feature in the lower center of what is now the water-filled borrow pit. This circular feature gives a signature that is indistinguishable from others in the same photo which are now known to be housepits. In other words, there was at least one other large housepit on the site that has been completely destroyed.

The concentration of archaeological remains in Area II has clearly been disturbed to a great degree by the earthmoving activity documented in Figure 18. The earthmovers were, at the time of the photo in 1969, parked over a portion of Area II, and the ground surface seems to be massively disturbed. The sediments in the test pits upstream from the pond, substantiate a great deal of disturbance (see Chapter VI). It is even possible that some of the cultural material in our test pits in Areas I and II was dragged up here from an original source in the borrow pit. In any case, it should be clear that the entire area above the borrow pit has been massively disturbed. It will be recalled too that the site identified in this vicinity in 1960 was described as badly potted to the extent that it warranted no further testing.

Areas I and II appear to be badly disturbed remnants of the original archaeological deposits that probably ran uninterruptedly from the trestle to a point slightly downstream from the housepit cluster. The discontinuity between Area II and III was created with the borrowing

of fill, and photographic evidence indicates that at least one housepit was present where the sediments were removed in the borrow pit.

Area II produced cultural material that was concentrated in the upper 40 centimeters but with a few items occurring to more than a meter in BH-6. Between Areas I and II is a culturally sterile area over which all fine-grained sediments have been scraped down to the flood gravel base.

Cultural material in Area I was dispersed through the 80-120 centimeters of sediment above the flood gravel with no evidence of concentration at any level. As in the case of Area II, no features of any kind were encountered in Area I.

Most of the housepits have some evidence of minor disturbances that are probably the result of relic digging activities. There are signs of a few pot-holes in housepits #2, #6, #7, and #8 (see Figure 23). Our test pit in housepit #3 partially overlapped a small surface depression within the larger depression of the housepit. This pit produced quantities of historic debris and may represent a small trash pit. None of these holes, however, are likely to have disturbed more than a small portion of the house remains and, in most cases, may not have extended deep enough to encounter the house floors.

To summarize our assessment of site integrity, Areas I and II appear to be severely disturbed deposits containing very low densities of artifacts and debris. No living floors, vertical concentrations, or features were encountered in any of the test pits excavated in these two areas. It may be concluded that these areas represent remnants of the back side of a portion of the site that has been largely destroyed by construction of the trestle, raising of the Lower Monumental Pool, and pot-holing activity. Area III presents a quite different picture in terms

of its preservation. Minor disturbances may be identified in various housepits and in the areas surrounding them--especially along the river side of the housepit cluster. These disturbances do not in any significant way detract from what is still an exceptionally well preserved and substantial area of archaeological deposits containing remains of several houses with intact floors.

Summary of Test Results

The prehistoric remains that have been identified and explored in this testing project appear to represent surviving portions of what was originally a much more extensive site. When a survey crew documented the presence of a site (45FR36) below Joso Trestle in 1960, they only recognized the upriver portion of a larger site containing structural remains on its undetected downstream end. Subsurface tests and evidence from aerial photographs support the conclusion that various earthmoving disturbances in the vicinity have reduced the formerly continuous archaeological deposits into three discontinuous concentrations--Areas I, II, and III (see Figure 24).

The site can be partitioned into at least two subareas based upon the presence or absence of structural remains. Upstream portions of the site would typically qualify as a "campsite" due to the absence of housepits. Whether this area of the site was actually utilized as a camp at some other season of the year than that during which the pithouses were occupied, is unclear. We can state that both areas of the site are probably the remains produced by a single cultural system whether or not they were seasonally differentiated occupations.

Areas I and II contain deposits that have been badly disturbed by construction activities associated with the building of the Trestle

as well as the road that parallels the river across a portion of the project area. In addition, borrowing activities destroyed a central portion of the site that probably contained at least one other housepit and, at the same time, created the discontinuity between Areas II and III. Scraping activities further upstream removed all artifact bearing sediments that undoubtedly were once present between Areas I and II. Examination of the sediments in test pits dug in Areas I and II testified to the severe disturbance that has taken place in these two areas. Also, it was mentioned that almost nothing in the way of faunal remains were recovered in Areas I and II, lithic densities were considerably lower in these areas than in Area III, and features of any kind were not found. These facts, compared with the original observations made upon the site by archaeological surveyors in 1960 (Mallory 1961), lead to the conclusion that Areas I and II are not only poorly preserved site remnants, but they are remnants of the "back side" or marginal area of the site.

Area III contains the remains of about eight surficially visible structures or housepits. These housepits still seem to be remarkably intact though there is some evidence of potholing in a few places, and there have been disturbances by heavy equipment along the river side of the housepit cluster. In each of four housepits tested, clearly defined floors with high densities of faunal and lithic materials were encountered. This area of the site promises extensive living floors from within and around houses.

Materials found in the housepits that were tested indicated a general uniformity in their antiquity as did diagnostic artifacts recovered in other areas of the site. Radiocarbon dates from features in two housepits range from 2,080 to 2,435. There is no evidence to indicate that the site was utilized subsequent to this interval by aboriginal peoples.

Both the lithic and faunal assemblages collected at Lyons Ferry are distinctive from those known from more recent pithouse sites in the Southern Plateau. The lithic sample is characterized by a low artifact to debitage ratio, low frequency of cobble tools, and high frequencies of scrapers and utilized flakes. The faunal sample from Lyons Ferry contains much higher proportions of large mammals (bison and elk) than do assemblages known from more recent residential sites. Ungulates in general (including deer and antelope) comprise a high percentage of the total number of faunal elements from this site while fish and small mammalian elements are relatively low in frequency. It is difficult to avoid the conclusion that we are dealing with a subsistence system quite distinctive from those of the later prehistoric period.

NOTES

1. During the winter of 1979-1980, approximately 100 backhoe trenches were excavated by the Corps of Engineers to obtain geological information across the flat below Joso Trestle (LeRoy Allen, personal communication). A communication failure had apparently contributed to the belief that the area was already cleared of significant cultural remains.

2. Wesson (personal communication) was unable to specify which depressions he had tested and he did not establish a site datum.

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CHAPTER VIII

SIGNIFICANCE OF THE HISTORIC REMAINS OF TRESTLE CITY

by

Gregory C. Cleveland

The Lyons Ferry Hatchery Project will destroy the integrity of the historic remains associated with the construction camp discussed in the section on "Trestle City." The major impact will be caused by construction of the fish runs to be excavated in the flat near the central cluster of remains and residence construction along the river bank (Figure 15). This impact has been discussed in the field during an on-site inspection by the Deputy State Historic Preservation Officer, the official representative of the U.S. Corps of Engineers (Walla Walla District), and the archaeological contractor's representatives.

In evaluating the site's significance in view of determining eligibility to the National Register, the guidelines set forth at 35 CFR 60.6 must be applied to what we now have learned about these historic materials. These guidelines, especially 36 CFR 60.6, National Register criteria for evaluation suggest that archaeological remains "(a) associated with events that have made a significant contribution to the broad patterns of our history" are eligible historic properties; and also under criterion "d" which states that a property may qualify if it has "yielded, or may be likely to yield, information important in prehistory or history."

Research Problems Associated With Criterion "a" 36 CFR 60.6

The data generated from the historic tests and background research at Lyons Ferry mean nothing in and of themselves. If, however, these remains are considered in light of economic expansion and the broad patterns

in development of the Inland Empire market economy, meaning (perhaps significant meaning) may be assigned to these data. The following topics could be considered and evaluated under this criterion using railroad related data bases:

(a) The ethnic mix of immigrants and the labor force during turn of the century expansion.

(b) The interplay between river and overland traffic in light of this competitive expansion.

(c) The role of competition between railroads for speculative markets.

An example of one work which is an admirable study of this kind is Alexander C. McGregor's (1971), "The Economic Impact of the Mullan Road on Walla Walla, 1860-1883." This treatise shows how the Mullan Road inadvertently gave support to Walla Walla as a regional center by connecting it to mining and agricultural markets.

The relevant question here, however, is how the remains of the Trestle City construction camp can be considered relevant to the same kind of economic process.

Perhaps a series of arguments linking the camp to the trestle, the trestle to railroad expansion, and railroad expansion to the broad pattern of economic development might suffice. Or perhaps this criteria ("a") is so general that all archaeological sites can be arguably significant in light of it.

Research Problems Associated With Criterion "d" 36 CFR 60.6

Criterion "d" is the other general yardstick against which many archaeological and historic properties are measured "significant." It holds that if a site has produced or is likely to produce important information, it must be dealt with. The key here, it would seem, is the

word "important." As we are all aware, this criterion, too, is relative and varies with the preservationist(s) involved.

In an attempt to solve this particular problem, Lipe (1974:228) argued that preservation should include "the main varieties of sites found" in a particular part of the country or region. Although Lipe may have been explicitly concerned with prehistoric sites, this goal can be considered for historic properties as well. Importance, then, can be assigned to sites that represent a "type" of diversity.

In light of this consideration, generating a typology of historic properties, assessing their redundance across the landscape, and arguing that any particular site should be saved as a "type site" constitutes a major facet of determining eligibility.

In the case concerning us here, the Trestle City construction camp, representing as it were, a type of site within the purview of public archaeology is an important question.

Historic sites archaeology has not been an integral facet of research along the Lower Snake River in the past. Few historic sites known to the authors have been nominated to the National Register and few have been excavated; Alpowa (Adams, Gaw, and Leonhardy 1975) and an historic component at Wawawai, 45WT39, (Adams 1972) are exceptions. No railroad sites have been dealt with explicitly, although Squirt Cave (45WW25) had an historic component probably relating to Chinese railroad laborers. The aforementioned construction camp at Chew (Stratton and Lindeman 1975) and the railroad town at Ainsworth, near the confluence of the Snake and Columbia Rivers, are other known sites. A small dump site on Devil's Bench (Cleveland and Schalk 1980) probably relates to the period of "turn of the century" railroad construc ion. It also deserves mention that many of these sites concerned with the major construction phase of the

railroads are inundated, including the beehive shaped ovens of subangular basalt cobbles recorded near Indian Bar in the Lower Granite Reservoir (R. Sprague, R. D. Daugherty, personal communication) which were probably of railroad laborer origin. Of these sites, few in number and most underwater at present, none are or were known construction camps. This supports an argument that the Trestle City camp is a unique remaining historic railroad site and should receive our attention as preservationists.

Criteria "d" also opens up a Pandora's box of considerations relating to archaeological information. Given our lack of archaeological data from historic sites in general and from railroad sites in particular, archaeological information from "type collections" could be generated for use in comparative studies. The tight chronological control at this site is an advantage here.

Other sources relating to criteria "d" and data collection strategies might include living informants and historical documents, especially archival material in the possession of the railroads.

Recommendations

Recommending alternative courses of action in dealing with the Trestle City remains which would satisfy all parties involved is difficult indeed. The historic site at Lyons Ferry as of this writing is already or soon to be surface collected and partially excavated (R. Sprague, personal communication) by the University of Idaho under contract to the U.S. Corps of Engineers, Walla Walla District. The specifics of the research strategy to be used are still apparently being evolved such that we cannot comment on or evaluate the proposals being negotiated. The Laboratory of Archaeology and History is cooperating in supplying

information to all parties involved in negotiation as a result of the test excavation at Lyons Ferry.

We are hesitant at this sensitive stage to detail our own biases in research by making recommendations independent of the contractor approached by the U.S. Corps of Engineers.

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AD-A129 434 CULTURAL RESOURCE INVESTIGATIONS FOR THE LYONS FERRY FISH HATCHERY PROJEC..(U) WASHINGTON STATE UNIV PULLMAN LAB OF ARCHAEOLOGY AND HISTORY.. R F SCHALK ET AL. 3/3

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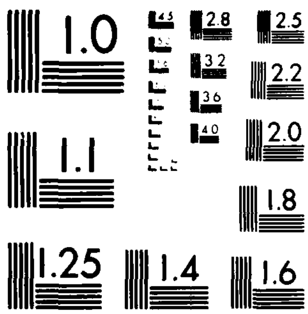

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CHAPTER IX

SIGNIFICANCE OF THE PREHISTORIC REMAINS

by

Randall F. Schalk

The prehistoric remains at Lyons Ferry are evaluated here in terms of the "d" criteria of the National Register. This criterion applies to archaeological resources "That have yielded, or may be likely to yield, information important in prehistory or history (36CFR 60.6 & 800.10)." The remaining sections of this chapter set forth the kinds of information that seem to be present in the Lyons Ferry site and the ways in which this information could contribute to research questions of significance both to an understanding of regional prehistory and hunting and gathering adaptations generally.

Culture Change After the Beginnings of Winter Sedentism

After the initial appearance of pithouse communities along the floodplains of the major drainages in the Plateau, aboriginal adaptations are generally thought to have been stable and non-dynamic (see Chapter II). A temporal span of roughly 3 to 4 millenia is involved and, to date, the only changes that have been identified in this long sequence prior to the arrival of the horse are minor changes in lithic assemblages. These changes have traditionally been considered as the inevitable and capricious drifting of aboriginal fashions rather than as possible evidence for deeper, less obvious changes in the way human populations articulate with their ecosystems. Although evidence for certain differences in the inventory of resource species have sometimes been noted (Schroedl 1973),

no general directional processes in subsistence have been proposed for this interval. It seems increasingly apparent that the assumption of adaptive stability is not supported by any systematic study that sought to investigate the validity of that assumption. Measurement of adaptive change and stability will require more than observations about the continuity in a house form, various technological items, and the presence or absence of various species.

In previous sections of the report, evidence was presented that the faunal assemblage from the Lyons Ferry site and perhaps other early housepit sites is quite unlike those known from more recent prehistoric residential sites. The relative frequency of large mammals, primarily bison and elk, seems to have declined substantially, and this decline was offset by dramatic increases in the frequency of both small mammals and fish. It is asserted here that these trends suggest that some major shifts in subsistence are indicated for an interval which has so often been viewed as non-dynamic. Space and time do not permit consideration of all of the implications of such economic shifts, but they are likely to have been associated with changes in settlement system, hunting technology, social organization, and population density.

Residential sites, in many respects, are central to any understanding of a total subsistence and settlement system (Binford 1979:496). housepit sites along the Lower Snake have been systematically eliminated with hydroelectric development. Of those that have been reported, Martindale and Strawberry Islands near Pasco are the only other housepit sites that we are aware of for the entire Snake drainage below Lewiston, Idaho. Both of these sites are apparently late prehistoric so that Lyons Ferry represents the last known early housepit site that remains accessible for research in the forseeable future throughout this entire area.

Regional Settlement Systems

Settlement studies pertaining to the past 4,000 years of the prehistoric era in the Lower Snake area are nonexistent. The potential for such studies in the Palouse/Lower Monumental region is, however, very good, and Lyons Ferry represents a kind of site that will be critical to these investigations.

One reason that the area about the mouth of the Palouse River is particularly well-suited to the study of regional settlement systems is that the Palouse River is one of only two major confluences along the whole Lower Snake. (The Tucannon River is the other.) This fact is probably not unrelated to the dense occurrence of archaeological sites of great variety about this confluence. The vicinity is what Binford (1979: 490) refers to as a "center of residential concentration" and what Nelson and Rice (1969) have called "site complexes." In such areas a wide variety of functionally distinct archaeological remains occur and, in this case, there are rockshelters with habitation remains (Marmes Rockshelter), caves with storage facilities (McGregor, Porcupine, and Squirt), and stratified open sites and burials (45WT2). In addition, a large number of other special purpose sites are known from the vicinity of the Palouse confluence, and these include mesa top storage facilities and a variety of cairns and rock alignments. During the course of our work at Lyons Ferry, at least five talus slope storage facilities were found along the foot of the talus immediately downstream from the project area. There has not yet been an intensive inventory survey of the archaeological remains in the Lower Palouse vicinity but when one has been conducted, there will undoubtedly be even more sites added to what is already a very large, known concentration. While many of these remains have not yet been

investigated, the investment of archaeological effort in the immediate vicinity of the Palouse confluence over the past three decades represents the greatest such investment for any other region of the Lower Snake. It would be unfortunate if information that has been previously collected from this region is not employed as the foundation upon which future research rests.

It is an important fact that the information potential of a housepit village like the one at Lyons Ferry complements information which already exists on sites of other types for this region. Winter village sites represent an obvious gap in the sample of sites that have been excavated in the Lower Palouse region. The Lyons Ferry site offers perhaps the last opportunity to recover that settlement information that would complement previous research investment in those other sites within this site complex.

The site complex, as a center of residential concentration is only a portion of an even larger, more dispersed settlement system that undoubtedly extended considerable distances into the surrounding uplands. This brings up another reason why this site is of special value for future studies of settlement. Large areas of the surrounding uplands are scabland tract which has not been subjected to the destructive effects of cultivation. Because land use in the scabland is generally restricted to grazing, it may be anticipated that archaeological sites in these areas of the uplands will be unusually well preserved. This is not the case for the areas further east along the Lower Snake where deep soils have permitted a long history of wheat farming. Similarly, circle farms based upon irrigation have already made substantial inroads into the areas away from the river in the more arid regions to the west. The result of these different land use potentials for agriculture along the

Lower Snake is that the scabland tract offers the most promising area for studies that could produce a more complete picture of aboriginal land use systems. Lyons Ferry again looms important as an integral part of a regional system that can be investigated more effectively than in other regions of the Lower Snake.

Adaptive Variability Along Environmental Gradients

In Chapter II we alluded to possible gradients in the relative frequency of various faunal resources from archaeological sites along the Lower Snake between Pasco and Lewiston. Along this gradient, precipitation increases and temperature decreases with a gradual rise in elevation. It is not unreasonable to expect a correlated gradient in the relative abundance of various plant and animal resources at any time in the past. It is not known in any dependable way how these environmental differences would have conditioned their associated cultural systems.

Because archaeologists are looking more to the theoretical structure of evolutionary ecology, it is reasonable to expect that consideration of adaptive diversity along these large scale environmental gradients will be a subject of increasing concern in the years to come. In particular, we envision important studies involving the comparative analysis of functionally analogous archaeological sites (e.g., winter villages) along such environmental gradients. In this case, the most promising sites for comparison would be residential sites because they probably contain the most complete information about the entire cultural system (see Binford 1979:482-497; 1980).

Since faunal assemblages would be a key information requirement for such studies, we can already identify areas for which there are

presently gaps in the record. A substantial amount of faunal information already exists for residential sites in the Lower Granite Reservoir (Lyman 1976). Also, faunal studies from the late prehistoric site at Strawberry Island near the mouth of the Snake have been reported (Gray 1978) and are still being conducted by the authors. In between these two areas is a vast stretch from which very little in the way of faunal information exists for post-sedentary residential sites. The Lyons Ferry site has well preserved faunal remains and its central location along this gradient makes it an especially desirable data source for addressing questions of this variety.

Site Structure

Excavations in housepit sites in the Plateau have typically been quite limited in their scope. Rarely have excavations gone beyond the removal of fill from one or a few selected housepits and, at most, very limited explorations of surrounding areas. One of the consequences of these very restricted excavations is that there is no explicit knowledge of the internal structure of whole sites. In a very real way, we know a good deal about the archaeology of individual housepits and almost nothing about the larger site of which they are a part. To mention an oft-cited analogy, we have considerable information about the anatomy of single "organs" (households) in a community but very little about their functional relationships in the overall "organism" (the co-resident local group). There is every reason to suspect that these sites are internally complex and that ordered relationships obtaining between domestic structures, activity areas, features, and individual artifact and debris classes only await the asking of appropriate questions and the designing of the

necessary excavation strategies that would permit their detection. The irony of the current situation is that without completely or even extensively excavated sites, there is little emperical basis for the designing of sampling procedures that would maximize the chances of recovering representative samples in more limited excavations. Site testing, therefore, remains a primitive art.

To gain anything more than a superficial understanding of past cultural systems, it will be necessary to document the variability that exists within total sites. Variations in the structure and content of the different domestic structures as well as all surrounding deposits on a site are essential to examination of questions pertaining to social organization, the division of labor in subsistence, and generally the organizational character of local groups.

Potentially fruitful hypotheses to be investigated in such studies are presently available. To give one example, Binford suggests that the characteristic frequencies of various anatomical parts associated with individual consumer units will vary with the size of meat inputs to the local group (Binford 1979:472). Where large meat inputs typically occur, such as in the case where multiple kills take place, the various consumer units (households) will receive entire animals as units of redistribution. Faunal assemblages associated with the individual households would, in this case, tend to be quite similar in terms of the relative frequencies of various anatomical parts. On the other hand, where meat inputs are characteristically small and occasional, he suggests that the various portions of the animal will be redistributed according to the social relationships between members of the group and the person doing the redistributing. In this case, faunal items associated with individual households would be expected to be more variable than where meat inputs

are large. If data essential to investigation of this hypothesis were available for residential sites in the Plateau, we might stand to learn much about hunting practices, the character of redistribution, and division of labor. Here again, some interesting patterns have been reported for individual domestic structures (c.f. Lyman 1980:117), but the data required for the comparisons of multiple domestic units within a community have rarely been collected.

The Lyons Ferry site has several characteristics which make it well-suited to the future examination of such questions. For one, it includes a cluster of structures which have a high probability of having been utilized simultaneously at times in the past. A second quality of the site of relevance here is that the occupations in these structures appear to represent a fairly thin slice of archaeological time. As a result, the degree of mixing of remains from many centuries and even millenia that often is characteristic of housepit sites (c.f. Daugherty et al. 1967:26) may be minimal. Because we suspect a considerable degree of change in subsistence during the past 3 to 4 millenia, it would be desirable to focus attention on the investigation of sites where temporally discrete occupations occur. Testing of the Lyons Ferry site indicated that the site was primarily, if not exclusively, occupied before 2,000 B.P. though this assessment could be modified in future work. Finally, in each of the housepits that was tested, there was a well defined living floor containing a high density of debris.

Summary

In summary, the prehistoric deposits within the hatchery project area exhibit great potential to contribute to an understanding of the prehistory of this region. The site falls temporally within the early portion of Leonhardy and Rice's (1970) "Harder Phase"--an interval which has received minimal previous attention along this reach of the Lower Snake. In functional terms, the site has been identified as a winter residential occupation and it is argued that such sites are of particular importance in the investigation of questions pertaining to cultural change. Finally, it must be emphasized that this type of site is now quite rare and that it falls geographically within a large area that is not known to contain other sites that are comparable.

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CHAPTER X

MITIGATION ALTERNATIVES AND RECOMMENDATIONS

by

Randall F. Schalk

Anticipated Impacts upon Archaeological Remains

The Lyons Ferry Hatchery, as it is presently designed, would result in virtually the complete loss of all of the historic and prehistoric remains described in Chapters 5 and 7. The locational relationships between hatchery facilities and archaeological remains are illustrated in Figures 13 and 24. It can be seen that most of the historic remains are concentrated in the area that is planned for the construction of raceways 1, 2, and 3. Area III of the prehistoric deposits lies in a location where the fish egg removal facility has been designed. Areas I and II of the prehistoric deposits are situated where residence #6 and #8 are to be constructed. Due to the extent of spatial overlap between hatchery facilities and archaeological deposits and also due to the extensive earthmoving that will be required during construction of the hatchery, it is unlikely that any significant portion of the archaeological site would remain intact after project completion. The archaeological deposits are largely confined to the upper meter of sediments and there are no apparent portions of the archaeological site that would not be disturbed to at least this depth.

Alternatives for Mitigation of Impacts

There would appear to be only three alternatives for the mitigation of impacts from this project upon archaeological resources--data recovery, partial preservation, or a combination of both. Total avoidance

of the historic and prehistoric archaeological remains would necessitate relocation of the entire hatchery and this does not appear to be a realistic possibility. Space is limited on this river terrace and the hatchery requirements for space probably could not be met in any other suitable and adjacent area. Considerable investments have already been made with the assumption that the hatchery would be located in this specific location. At this point, it must be assumed that any mitigative action would involve either the recovery of information on the archaeological remains prior to their destruction or partial preservation by means of minor changes in the hatchery design.

The Remains of Trestle City

The historic remains of Trestle City are situated where three large raceways have been designed. Any mitigation of the loss of these remains will necessarily involve some form of data collection. Negotiations concerning data recovery pertaining to the historic resource between the University of Idaho, the Corps of Engineers, and the deputy State Historic Preservation Officer took place while the site was being tested. It is, therefore, unnecessary to make further recommendations here concerning the mitigation of the historic cultural resource.

Areas I and II

Areas I and II (see Figure 24) are badly disturbed and marginal portions of a much larger site that apparently extended continuously from at least 100 yards upstream of the trestle to the downstream edge of Area III. These two areas contain deposits that have been extensively rearranged by the construction of the trestle, a road, and a borrow pit in or adjacent to the project area. Testing in these areas failed to reveal deposits

with stratigraphic integrity, features, or densities of artifacts and debris that would warrant further excavation. It is our assessment that these areas are not worthy of further data recovery or preservation activity. It is, nonetheless, possible that construction activity could expose remains in Areas I and II that were missed during testing. It is recommended that construction in Areas I and II be monitored by a qualified archaeologist so that potentially significant remains can be identified should they be unearthed and appropriate action can be taken.

Area III

Area III represents a sizable portion of the site which contains domestic structures and intact surrounding deposits. Representatives of the Corps of Engineers have expressed a willingness to preserve a substantial portion of Area III within the hatchery and maintain the area with the natural vegetation that occurs there presently. This preservation effort would require redesigning of the fish egg removal facility so that it would be located immediately downstream of these deposits. This course of action would insure long-term protection within the boundaries of the hatchery. In addition, this alternative would make these deposits available for visitation by the public with future interpretive potential as well as availability for unforeseen research questions as additional benefits. This course of action seems to be, in many respects, the ideal alternative for mitigation and the one that is likely to be most economical.

To insure that the deposits in Area III are not disturbed during construction, it is recommended that the portion to be preserved be fenced off prior to the initiation of construction and preferably as soon as possible. Figure 28 shows the recommended area for inclusion

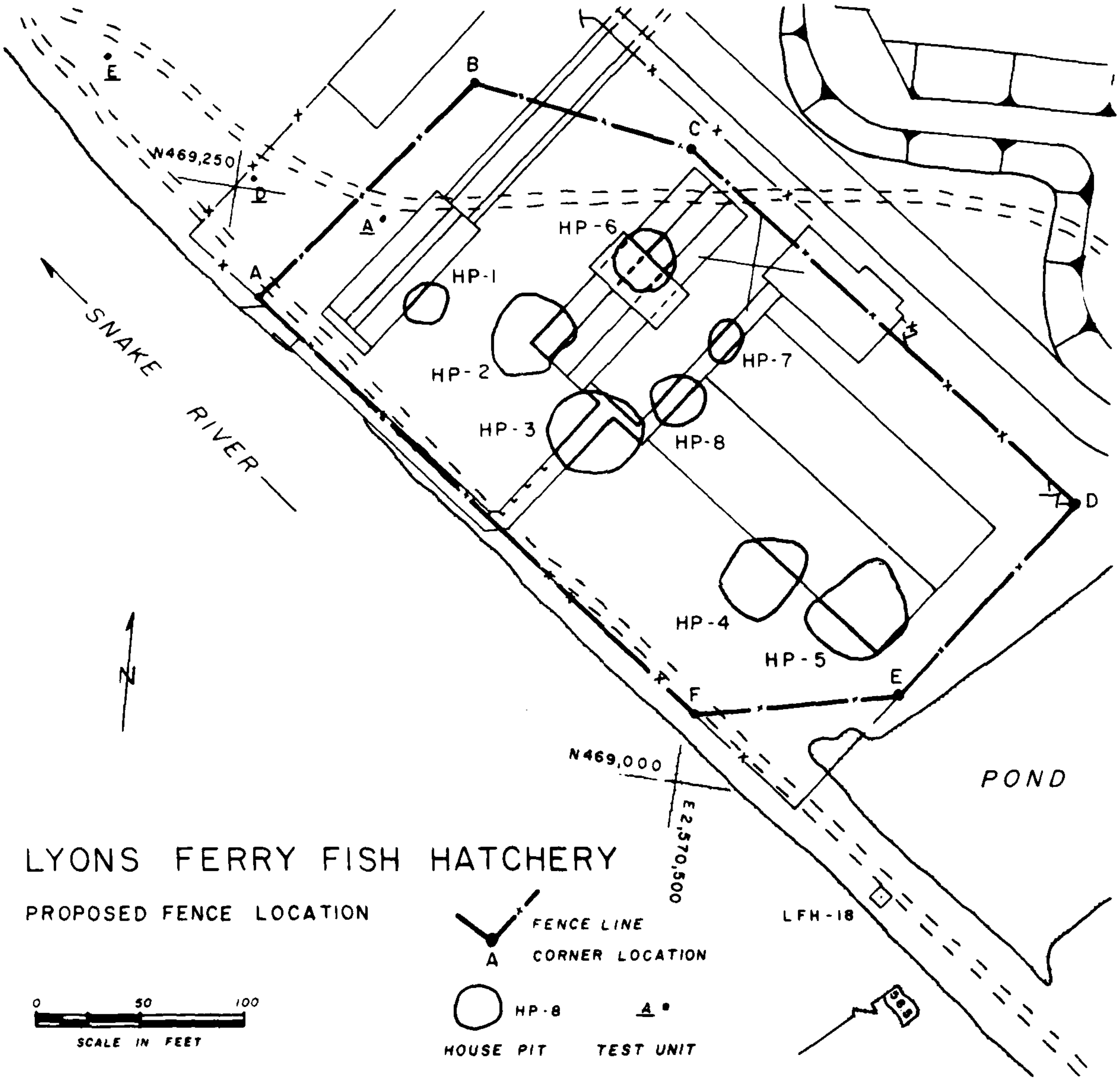

Figure 28. Suggested area to be fenced for preservation.

within the boundaries of the fenced preserve. The Lambert coordinates for the six points (see Figure 28) bounding this area are:

A = N 469,199
E 2,570,268

B = N 469,315
E 2,570,347

C = N 469,300
E 2,570,462

D = N 469,160
E 2,570,668

E = N 469,057
E 2,570,599

F = N 469,034
E 2,570,504

The fence should <u>minimally</u> enclose this area but need not conform exactly to its irregular shape. It may be simpler to fence off a rectangular area rather than this six sided area. From our testing, it is believed that this rectangular area would include not only all of the house remains that have been identified but most of the surrounding deposits as well. It is possible that features or remains (e.g. disposal areas, burials) not identified during site testing may be exposed during construction in those areas immediately surrounding the portion that would be fenced, so it is important that an archaeologist be present during construction to monitor all earthmoving activity in the vicinity of Area III.

Because of the stated commitment of the Corps of Engineers to preserve this portion of the site, no extended discussion of a data recovery program is presented here. If, however, the preservation of this portion of the site should, for some reason, prove to be impractical, it is recommended that a data recovery program be resorted to. This effort should include the complete excavation of the house floors in

all housepits. Three dimensional proveniences should be taken for artifacts and debris on these floors although the secondary depositional character of houserims may permit the use of less exacting excavation procedures. Because of the present scarcity of sites of this variety in this region and the Lower Snake in general, it is essential that data recovery go well beyond the excavation of one or a few houses. We have identified research questions which can only be addressed when representative information is available on the variation within the different houses, structures, and areas within sites.

Extensive excavations of the areas surrounding house structures should also be undertaken. These areas have typically been neglected or only cursorily explored in salvage excavations in the Plateau. Many research questions of current and presumably future interest will require representative faunal and lithic collections from various areas within the site.

Lastly, it is essential that adequate time be afforded a data recovery program of this scale. At least two years would probably be required for complete cycle of excavation, analysis, and preparation of publication.

Additional Recommendations

Consideration should be given to the development of interpretive facilities for the archaeological resources of the Palouse Canyon vicinity. There are numerous and diverse archaeological sites all within hiking distance about the mouth of the Palouse; these include, besides the site treated in this report, rockshelters, caves, mesa-top sites, open sites, talus storage pits, and a variety of rock alignments. All of these

occur within what is an exceptionally scenic and largely natural setting. They are also lands owned by the Corps of Engineers and managed by the State Park system. Presently there is very little in the way of interpretation of this area's rich historic and prehistoric heritage. The state park at the mouth of the Palouse offers facilities for swimming, picnicking, boating, and camping but would benefit greatly from some imaginative attention to public education and recreation related to history and archaeology. Many of the archaeological sites, for example, could be included as visitation points for self-guided tours that would require little more than trail markers and interpretive guidebooks.

Finally, it is recommended that the prehistoric site at Lyons Ferry be nominated to the National Register. It should be included along with Marmes Rockshelter, McGregor Cave, Porcupine Cave, and several other nearby sites as a part of an archaeological district.

ADDENDUM

Since completion of the testing project described in this report, the Lyons Ferry Hatchery has been completed and is now in operation. The Laboratory of Anthropology of the University of Idaho conducted salvage excavations of historic remains of the Joso trestle construction camp prior to the initiation of construction. The prehistoric housepit cluster was enclosed with an eight foot high hurricane fence (as recommended in Figure 28) prior to construction activities and was thereby embedded within the hatchery facility where it now enjoys virtually continuous preservation and protection.

When in-place preservation of the housepits was being discussed as an alternative to a major data recovery effort in the summer of 1980, the most compelling argument for preservation was that the guidelines for federal historic preservation specifically identify data recovery as the last alternative when all other options have been determined unachievable or inappropriate. This argument was bolstered by the fact that preservation was the most cost effective alternative because it eliminated the necessity for a very costly excavation project. A counter argument was that the site might be destroyed by careless heavy equipment operators or relic hunters. In essence, this argument held that any attempt by the Corps to preserve the site would be unsuccessful and, therefore, salvage excavation offered the only means to insure that some information would be recovered. It is quite reassuring to see that this viewpoint appears to have been overly pessimistic.

During a recent visit to the site, examination of the housepit cluster indicated that the deposits there were as intact as they had been when the test pits were backfilled in the summer of 1980. From conversations with a resident employee of the Washington State Fish and Game Department, we learned that the fenced in archaeological site has come to serve a double purpose. Game birds have apparently found the enclosure ideal habitat for feeding, nesting, and roosting, due to the presence of natural vegetation within it and the exclusion of predators. The hatchery facility appears to be an excellent example of how multiple use goals can be achieved when there is thoughtful planning on the part of a federal agency. There is every reason to believe that the actions by the Corps associated with the hatchery project represent a showcase example of good cultural resource management in the Northwest.

In the light of new information available since completion of this project, there are a number of other comments that may be made about the substantive content of this report. The first has to do with the chronological discussions presented in Chapter 2. It was known at the time this chapter was written that the three stage sequence of land use systems was a "radical lumpers" approach. This is even more obvious now. The interval between the initiation of winter sedentism more than 3,000 years ago and the arrival of the horse in the early 1700s, for example, already appears to be one which could be split into finer intervals based upon directional changes in settlement and subsistence.

Since much of the research bearing upon this subject is currently in progress and will be published in the near future, the comments here will be restricted to two points.

The first is that recent studies in palynology indicate greater climatic variability during this interval than has previously been imagined (cf., Bartholomew 1982). The second point is that faunal assemblages associated with housepit sites from the Lower Snake and Middle Columbia spanning the last 2,500 years seem to evidence a number of trends in the relative frequencies of bison, elk, deer, antelope, rabbit, and fish. Correlated with these changes there are apparent changes in house architecture, community pattern, and stone tool inventory.

The housepits in the hatchery fall within the early Harder Phase (Leonhardy and Rice 1970) and, as such, seem to exhibit a number of characteristics that distinguish them from later residential sites. The houses of this period are often quite large and deeply excavated, possibly with annular benches and ramp entrances. One gets the impression that well-defined, multiple hearths, and living floors with relatively high density concentrations of debris are also characteristic. Houses tend to occur in small groups though the size of some houses suggests multi-family domestic groups. Bison and elk remains are present in higher frequencies than occur in most housepit assemblages of later times. Small mammals and fish, however, seem to be relatively scarce in these assemblages. Although the bow and arrow may already have been in use, the atlatl was still the primary hunting device.

Turning to issues pertaining to management, there are three recommendations that were not made in Chapter 10 but which were made in other sections of the report or verbally to representatives of the Corps. One is that precautions be taken to avoid ground disturbances that could result in activating dune-building (see Mierendorf's recommendations in Chapter 7). As recently as the 1920s, the dunes flanking the hatchery were quite active (Figure 12). A second recommendation is that cultural resources on the lower end of the terrace (downstream from the hatchery) be evaluated prior to further earth-moving activity in that area. A number of stone features including at least 5 talus pits were observed there during the 1980 testing. A third recommendation is that consideration be given to the use of fire in the early spring to control the growth of undesirable weeds within the fenced enclosure protecting the archaeological site. Burning would not adversely effect the archaeological deposits and would probably maintain the vegetation in a more natural state than will occur when all herbivores are excluded by fencing.

Finally, it has been noted that there are several archaeological and historical sites on the terrace near Lyons Ferry and that our reference to the "Lyons Ferry site" has, therefore, resulted in some confusion. To avoid further confusion, it is proposed that the site might appropriately be dubbed "Bone-in-the-throat" in recognition of the important faunal materials present in the site and the site's location; it is situated where a channel was to be built for capturing returning spawners for egg removal.

APPENDICES

APPENDIX A

IDENTIFIED FAUNAL ELEMENTS

by

Deborah L. Olson

TABLE 1

Identified Faunal Elements from Backhoe Trenches
45FR36, Lyons Ferry - 1980

Unit	Level	Taxon	Faunal Element	Number
BH-3	7	*Microtus*	Complete skull	1
		Microtus	Atlas vertebra	1
	8	*Microtus*	Bulla	1
BH-14	5	*Sylvilagus*	Right innominate	1
BH-20	20	*Citellus*	Complete skull	1
BH-22	1	*Citellus*	Complete skull	1
		Citellus	Right mandible	1
		Citellus	Left mandible	1
	9	*Cervus*	Antler fragment	1

TABLE 2

Identified Faunal Elements from Housepits
45FR36 Lyons Ferry - 1980

Housepit	Test Unit	Level	Taxon	Faunal Element	Number
2	1	4	*Bison*	Right distal tibia	1
		9	*Citellus*	Right and left maxilla	2
	2	13	*Cervus*	Antler fragment	1
	3	15	*Odocoileus*	Antler fragment	1
3	1	6	Leporidae	Shaft fragment	1
	2	5	Salmonid	Vertebra fragment	1
			Sylvilagus	Right proximal femur	1
5	1-N	6	*Cervus*	Antler fragment	1
		9	*Citellus*	Right innominate	1
			Citellus	Left innominate	1
			Citellus	Sacrum	1
			Citellus	Lumbar vertebra	1
			Citellus	Right femur	1
			Citellus	Left femur	1
			Citellus	Right tibia	1
			Citellus	Left tibia	1
	1-S	6	*Lepus*	Illium	1
		11	*Antilocapra*	Horn core	1
		12	*Lepus*	Proximal ulna fragment	1
			Bison	Distal fibula	1
			Bison	Right radial carpal	1
			Bison	Right intermediate carpal	1
			Bison	Right ulnar carpal	1
			Bison	Right carpal 2 & 3	1
			Bison	Right carpal 4	1

TABLE 2--(Continued)

Housepit	Test Unit	Level	Taxon	Faunal Element	Number
5	1-S	12	*Bison*	Right carpal 1	1
			Bison	Right pisiform	1
			Bison	Right proximal metacarpal	1
			Bison	Right metacarpal shaft fragment	1
6	1-N	12	*Antilocapra*	Horn core	1

TABLE 3

Identified Faunal Elements from Test Units
45FR36, Lyons Ferry - 1980

Unit	Level	Taxon	Faunal Element	Number
D	5	Cervidae	Antler fragment	3
	7	*Bison*	Right proximal metacarpal	1
		Bison	Right carpal 2 & 3	1
		Bison	Right carpal 4	1
		Bison	3rd phalanx	1
		Bison	Proximal humerus fragment	1
		Bison	Distal tibia fragment	1
	15	*Citellus*	Left mandible	1

TABLE 4

Identified Faunal Elements from Unstratified Aggregate Samples from Backhoe Trenches 45FR36, Lyons Ferry - 1980

Unit	Taxon	Faunal Element	Number
BH-19	*Citellus*	Left maxilla	1
	Citellus	Left anterior mandible	1
	Sylvilagus	Rostrum	1
	Bison	Incisors	2
	Bison	Molar fragments	6
BH-23 Dune Area	*Cervus*	Right mandible w/premolars 2, 3, 4, Molar 1	1
BH-28	Salmonid	Otolith	1
	Canis	Proximal metatarsal V	1
	Cervus	Antler fragment	1
BH-32	*Citellus*	Right mandible	1
BH-33	*Thomomys*	Ascending ramus of mandible	1

APPENDIX B
FAUNAL SKELETAL FRAGMENTS (N)
by
Deborah L. Olson

TABLE 1

Faunal Skeletal Fragments (N) from Backhoe Trenches
45FR36, Lyons Ferry - 1980*

Unit	Level	No. of Fragments								
		Mammalian Body Size								
		Large	Med/Lg	Medium	Small	Micro	Bird	Fish	UD	Total
BH-2	1								6	6
	2		3						2	5
	5					1				1
BH-3	7					2				2
	8					2		1		3
BH-6	4		1						1	2
BH-7	4		1	1					5	7
	7			1						1
BH-12	1			10					2	12
BH-13	4 & 5	3		55						58
BH-14	1		1	7		1				9
	2			14			1			15
	3			38					6	44
	4			30					6	36
	5	3		29	1				6	39
	6	1		22					17	40
	7			26					2	28
	8			26						26
	9			26					22	48
	10			7					7	14
	11			2					1	3
	12			1						1
	13			5					4	9
	14	1								1
	?		1							1
BH-15	1			5						5
	2			2					1	3
	3			10						10

*Faunal items that were clearly "large" or "medium" but not confidently assignable to one or the other were placed in the med/lg category.

TABLE 1--(Continued)

Unit	Level	No. of Fragments: Mammalian Body Size: Large	Med/Lg	Medium	Small	Micro	Bird	Fish	UD	Total
BH-15	4	3		9					1	13
	5			9					1	10
	6			7		1			2	10
	7			2						2
	8				1					1
BH-16	1			3					2	5
	2			2						2
	4			1						1
	6			1						1
	8					1				1
	12					1				1
BH-17	1								1	1
	5					1				1
BH-19	5			5					1	6
	6			15		1			1	17
	7			11		1			7	19
	8	1	1	17	1				2	22
	9		1	21					12	34
	10			30					12	42
	11			8					1	9
	12			8						8
	13			6						6
	14			3					4	7
BH-20	2			7	2					9
	3			4					3	7
	4			1						1
	5			1						1
	20				1					1
BH-22	1			6	3					9
	2			59			1			60

TABLE 1--(Continued)

Unit	Level	No. of Fragments							UD	Total
		Mammalian Body Size					Bird	Fish		
		Large	Med/Lg	Medium	Small	Micro				
BH-22	3			11					2	13
	4	2		31		2			1	36
	6			2					1	3
	7								1	1
	9	1							2	3
	11			1						1
	12			1						1
	13					1			1	2

TABLE 2

Faunal Skeletal Fragments (N) from Housepits
45FR36, Lyons Ferry - 1980

Housepit	Unit	Level	No. of Fragments							UD	Total
			Mammalian Body Size					Bird	Fish		
			Large	Med/Lg	Medium	Small	Micro				
2	1	1			2						2
		2			13	1				3	17
		3	5		25					62	92
		4	10	56	18	1				26	111
		5	4	11	5	1				29	50
		6			2					3	5
		7			9				1	2	12
		8	2		3	2				6	13
		9	2	12	2	2	6			9	33
		10	2		13		1		2	9	27
		11			4						4
		12			4		2			1	7
		13			7						7
		14			2	2				1	5
		16			2						2
2	2	3								5	5
		4			3					11	14
		5	5	11	6					17	39
		6	1	6	1					14	22
		7	1	2	7					2	12
		8	5	2	3					9	19
		9		3	3					3	9
		10	2	4						2	8
		11		2							2
		12	1		23					11	35
		13	1								1
		14			1						1
		16								1	1

TABLE 2--(Continued)

			No. of Fragments								
			Mammalian Body Size								
Housepit	Unit	Level	Large	Med/Lg	Medium	Small	Micro	Bird	Fish	UD	Total
2	3	8			1						1
		13			8					3	11
		14			2						2
		15			16				1	1	18
2	4	16			16			1		13	30
		17	6	1	7					1	15
		18	4	17	18					13	52
		19	16	80	38						134
2	5	16			17					3	20
		17		2	1					2	5
		18		2	17					6	25
		19	43	29	21	3				57	153
		20	9	16	2	1				18	46
		21								1	1
2		-	4	1						6	11
3	1	3		1							1
		4			3					1	4
		5	2	4	4						10
		6	6		21	1			7	2	37
		7	2	3	1					13	19
3	2	1	1	1					4		6
		2								3	3
		3			4					1	5
		4	2	6	3				1	4	16
		5	8	90		4			1	19	122
		6	42	106	41					90	279
		7	3	12	1						16

TABLE 2--(Continued)

Housepit	Unit	Level	No. of Fragments							UD	Total
			Mammalian Body Size								
			Large	Med/Lg	Medium	Small	Micro	Bird	Fish		
5	1-N	2			4					4	8
		3			7					7	14
		4	2		15					10	27
		5			26					6	32
		6	2	4	3						9
		7	4	7	6						17
		8	9	12	11					19	51
		9	10	24	20	10				33	97
		10	6	28	11	1				30	76
		11		2	2					2	6
		12	1	5							6
		13				1					1
5	1-S	4			8					1	9
		5	5	4		1				2	12
		6		8	4	1				9	22
		7		4	17					7	28
		8	3	4	14					4	25
		9	2	12	7					21	42
		10	10	51	20					51	132
		11	5	27	3		1			3	39
		12	17	19		1				8	45
		13		1							1
6	1-N	3	2		1					13	16
		4			13					4	17
		5	3	5	9					2	19
		6	3	4	21					10	38
		7	7	18	16					11	52
		8	8	9	12		1			5	35
		9	4	3	19	1				1	28
		10	6	15	15	1				7	44

TABLE 2--(Continued)

Housepit	Unit	Level	No. of Fragments							UD	Total
			Mammalian Body Size					Bird	Fish		
			Large	Med/Lg	Medium	Small	Micro				
6	1-N	11	20	33	12			2		11	78
		12	4	9	25					13	51
		13		1						1	2
6	1-S	3			7						7
		4	1		16					11	27
		5	12	7	3					8	30
		6		15	6					4	25
		7		26	7					16	49
		8	1	12						2	15
		9	1	5							6

TABLE 3

Faunal Skeletal Fragments (N) from Test Units
45FR36, Lyons Ferry - 1980

		No. of Fragments								
		Mammalian Body Size								
Unit	Level	Large	Med/Lg	Medium	Small	Micro	Bird	Fish	UD	Total
A	2			4					1	5
	3			22					10	32
	4			31					8	39
	5	2	9	25					9	45
	6		1	20					1	22
	7			8						8
	8					1				1
	9			1					2	3
	10			3						3
	12	1							2	3
	13			1					5	6
B	1		1							1
	2		1	11					2	14
	3	1		11					2	14
	4	1	1						4	6
	5			8						8
	6		2	2						4
	7								1	1
D	2		1						1	2
	3			3					2	5
	4		3	9	1				9	22
	5	7	11	11					13	42
	6	8	91	11	2				4	116
	7	135	1,997	87	1		7			2,227
	8	79	680	24	7					790
	9	10	140	6	2					158
	10	2	50	2						54
	11		13	1						14

TABLE 3--(Continued)

Unit	Level	No. of Fragments: Mammalian Body Size: Large	Med/Lg	Medium	Small	Micro	Bird	Fish	UD	Total
D	12	1	28				1			30
	13	7	26	1						34
	14			2						2
	15		3		2					5
E	3				1					1
	7		1						1	2

TABLE 4

Faunal Skeletal Fragments (N) from Unstratified Aggregate Samples from Backhoe Trenches and Miscellaneous 45FR36, Lyons Ferry - 1980

Unit	No. of Fragments: Mammalian Body Size: Large	Med/Lg	Medium	Small	Micro	Bird	Fish	UD	Total
BH-19	31	56	12	4	2			11	116
BH-23	1								1
BH-27	16	94	9						119
BH-28	58	317	27	7		1	1	5	406
BH-32		1	1	1	1			1	5
BH-33					2				2
Cutbank near HP 1	7								7
Finds between HP 1 and 2	5		3						8
No provenience			4						4

APPENDIX C

OBSERVED BREAKAGE CATEGORIES OF MEDIUM AND LARGE MAMMAL FAUNA

by

Deborah L. Olson

TABLE 1

Observed Breakage Category of Medium and Large
Mammal Fauna in Backhoe Trenches
45FR36, Lyons Ferry - 1980

Unit	Level	Historic Sawed	Shaft Fragment		Rib Fragment	Cancellous	Complete	Other	Total
			>2.5	<2.5					
BH-2	2			3					3
BH-6	4							1	1
BH-7	4		1	3				1	5
	7		1						1
BH-12	1			10		2			12
BH-13	4 & 5		3	15	34	6			58
BH-14	?			1					1
	1		1	6				1	8
	2		1	13	1				15
	3		1	30	2			5	38
	4		5	19	6				30
	5		2	20	8	4		1	35
	6		2	16	5	3			26
	7		7	8	10	2		1	28
	8		1	21		4			26
	9		2	18	2	12		3	37

TABLE 1--(Continued)

Unit	Level	Historic Sawed	Shaft Fragment >2.5	Shaft Fragment <2.5	Rib Fragment	Cancellous	Complete	Other	Total
BH-14	10			6	1	3			10
	11		1	1					2
	12					1			1
	13			5					5
	14		1						1
BH-15	1		1	4					5
	2		1		1	1			3
	3		1	3	3	1		2	10
	4		2	6	4				12
	5			2	6	1			9
	6		1	3	2	2			8
	7			2					2
BH-16	1			3					3
	2			1	1				2
	4			1					1
	6			1					1
BH-19	5			8		1		1	10
	6		1	7	4	1		3	16
	7		1	4	5	3		1	14

TABLE 1--(Continued)

Unit	Level	Historic Sawed	Shaft Fragment >2.5	Shaft Fragment <2.5	Rib Fragment	Cancellous	Complete	Other	Total
BH-19	8		2	12	2	4		1	21
	9		2	10	10	3		1	26
	10		4	10	15	5			34
	11			5	3				8
	12			6				2	8
	13			4	2				6
	14			3		2			5
BH-20	2		3	4	1			1	9
	3			4		1			5
	4			1					1
	5			1					1
BH-22	1		3	3					6
	2		7	43	6	3			59
	3			10	1	2			13
	4			21		12			33
	6			1		1		1	3
	9					2		1	3
	11			1					1
	12			1					1

TABLE 2

Observed Breakage Categories of Medium and Large Mammal Fauna in Housepits 45FR36, Lyons Ferry - 1980

Housepit	Unit	Level	Historic Sawed	Shaft Fragment >2.5	Shaft Fragment <2.5	Rib Fragment	Cancellous	Complete	Other	Total
1	1	1					2			2
		2			8	5	1			14
		3		5	15	10	10			40
		4		8	20	26	30			84
		5			6	11	30		2	49
		6			2		1			3
		7		1	4	4	2			11
		8		1	4	4	2			11
		9		2	2	8	7		4	23
		10			11	4	6			21
		11		1	3					4
		12			2		2			4
		13			4		3			7
		14					1		2	3
		16			2					2
2	2	4			3		8			11
		5		2	9	11	13			35
		6		1	1	6	8			16
		7			8	2	2			12

TABLE 2--(Continued)

Housepit	Unit	Level	Historic Sawed	Shaft Fragment		Rib Fragment	Cancellous	Complete	Other	Total
				> 2.5	< 2.5					
2	2	8			9	2	8		1	20
		9			3	3	3			9
		10			1	4	1			6
		11				2				2
		12		1	10	13	8			32
		14		1						1
		16					1			1
2	3	8		1						1
		13			7	1				8
		14			2					2
		15		1	4	2	1		9	17
2	4	16			9	7	6			22
		17		2	10	2	1			15
		18		5	13	17	13		4	52
		19		6	45	25	60			136
2	5	16			4	6	7			17
		17			1		3		1	5
		18		1	10	6	6		2	25
		19		16	46	29	53			144
		20		2	6	16	16			40
		21					1			1

TABLE 2--(Continued)

Housepit	Unit	Level	Historic Sawed	Shaft Fragment >2.5	Shaft Fragment <2.5	Rib Fragment	Cancellous	Complete	Other	Total
2	-	-		1	6				2	9
3	1	3				1				1
		4			2	1				3
		5			4	1	5			10
		6		2	11	5	8			26
		7		1	7		11			19
3	2	1			2					2
		3			3		1		1	5
		4		1	3	6	2		3	15
		5		6	57	29	53		11	150
		6		4	95	68	96		14	277
		7			3	5	4		2	14
5	1-N	2		1	2	1	4			8
		3			7		3			10
		4	1	1	9	6	2		2	21
		5			22	4	2			28
		6		1	3	2			3	9
		7		2	11	3			1	17
		8		6	17	6	13		2	44

TABLE 2--(Continued)

Housepit	Unit	Level	Historic Sawed	Shaft Fragment		Rib Fragment	Cancellous	Complete	Other	Total
				>2.5	<2.5					
5	1 - N	9		15	16	16	21		6	74
		10		5	19	12	21		3	60
		11		2		1	2		1	6
		12		1	1				4	6
5	1 - S	4		1	7		1			9
		5		1	8		2			11
		6			11		7		1	19
		7			14	3	3		4	24
		8		3	7	8	4		3	25
		9		1	8	11	11		1	32
		10		10	32	31	28		5	106
		11		2	7	6	3		20	38
		12		7	8	6	7	8		36
		13							1	1
6	1 - N	3			3		4			7
		4			10	3	3			16
		5		1	11	3			2	17
		6		1	24				3	28
		7		5	18	15			3	41

TABLE 2--(Continued)

Housepit	Unit	Level	Historic Sawed	Shaft Fragment		Rib Fragment	Cancellous	Complete	Other	Total
				>2.5	<2.5					
6	1 - N	8		3	21	5	3			32
		9			13	11			2	26
		10		1	20	14	7		1	43
		11		7	43	16	9			75
		12		3	25	7	13		3	51
		13			1					1
6	1 - S	3			7					7
		4		2	21		4		1	28
		5		4	14		5		4	27
		6		2	19					21
		7			7	26	4			37
		8			9	4	2			15
		9		1	5					6

TABLE 3

Observed Breakage Categories of Medium and Large Mammal Fauna in Test Units 45FR36, Lyons Ferry - 1980

Unit	Level	Historic Sawed	Shaft Fragment		Rib Fragment	Cancellous	Complete	Other	Total
			>2.5	<2.5					
A	2			2	2				4
	3			23	4	3		2	32
	4			20	10	3			33
	5		1	29	5			1	36
	6		1	15	4				20
	7		1	6	1				8
	9			1					1
	10			2	1				3
	12							2	2
	13			1				1	2
B	1			1					1
	2			6	5			1	12
	3			8	4				12
	4			1				1	2
	5		1	2	5				8
	6			2				2	4
D	2					1			1
	3			3					3

TABLE 3--(Continued)

Unit	Level	Historic Sawed	Shaft Fragment > 2.5	Shaft Fragment < 2.5	Rib Fragment	Cancellous	Complete	Other	Total
D	4		1	4	7	3			15
	5		1	21	4	7		3	36
	6		6	38	34	33		1	112
	7		65	288	821	934	3	57	2,168
	8		24	121	219	394		24	782
	9		2	34	29	84		7	156
	10		1	15	10	28			54
	11			4	2	7			13
	12			10	9	10		1	30
	13		1	10	5	16		2	34
	14					2			2
	15				1	2			3
E	7			1					1

TABLE 4

Observed Breakage Categories of Medium and Large Mammal Fauna
From Unstratified Aggregate Samples in Backhoe
Trenches and Miscellaneous Finds
45FR36, Lyons Ferry - 1980

Unit	Historic Sawed	Shaft Fragment		Rib Fragment	Cancellous	Complete	Other	Total
		2.5	2.5					
BH-19		10	54	5	6		26	101
BH-23							1	1
BH-27		2	47	37	27		6	119
BH-28		22	105	75	180		21	403
BH-32			1				1	2
Cutbank near HP 1		7						7
Finds between HP 1 and 2		6	1		1			8
No provenience			2				2	4

APPENDIX D

by Deborah L. Olson

BONE TOOLS AND BONES WITH OTHER MODIFICATIONS

1 Antler Wedge	*Cervus* antler wedge in 18 fragments; reconstructed with evidence of cut marks and polishing. Housepit #2 - Test Unit #2 - Level 13
3 Fragments of Bone Point or Awl	Undetermined long bone shaft fragments of an artiodactyla that are polished. Housepit #3 - Test Unit #2 - Level 5
1 Fragment of Bone (Polished)	Undetermined long bone shaft fragment of an artiodactyla that is polished and burned (black). Housepit #3 - Test Unit #2 - Level 6
1 Worked Shaft Fragment	Undetermined long bone shaft fragment of a medium-sized animal. Housepit #3 - Test Unit #1 - Level 3
1 Polished Shaft Fragment	Undetermined long bone shaft fragment of a medium-sized animal with polishing. Backhoe trench #19 - Level 10
3 Shaft Fragments with Cut Marks	2 undetermined long bone shaft fragments of a large-sized animal; one $>$2.5 cm. in length with chop marks; the other $<$25 cm. in length with cut marks; one undetermined long bone shaft fragment of a small-sized animal with cut marks. Backhoe trench #19 - Unstratified Aggregate Sample
2 Rib Fragments with Cut Marks	2 rib fragments of an antiodactyla that have been burned (white) with cut marks. Housepit #3 - Test Unit #2 - Level 6

APPENDIX E

by Deborah L. Olson

LITHIC ARTIFACTS

Unit	Level	Projectile Points	Projectile Point Fragments: Tip	Projectile Point Fragments: Base	Projectile Point Fragments: Stem	Biface	Biface Fragments	Scraper and Scraper Fragments	Reworked Flakes	Utilized Flakes	Exhausted Cores with Utilized Edge	Anvil Stone	Cobble Chopper	Other	Total
No prov.	-				1										1
BH-2	5						1								1
	7									1					1
BH-3	3									1					1
BH-6	3	1													1
BH-14	-									1			1		2
	1								1						1
	2									1					1
	3								1						1
	4									1					1
	5						1			2					3
	6							1							1
	7									3					3
	8									1					1
BH-15	1									1					1
BH-16	1									1					1
	10												1		1
	11									1					1
BH-19	Bulk			1						3					4
	5					1			1						2
	6								1						1

APPENDIX E--(Continued)

Unit	Level	Projectile Points	Projectile Point Fragments			Biface	Biface Fragments	Scraper and Scraper Fragments	Reworked Flakes	Utilized Flakes	Exhausted Cores with Utilized Edge	Anvil Stone	Cobble Chopper	Other	Total
			Tip	Base	Stem										
BH-19	9									2					2
	11									1					1
	13									1					1
BH-20	7								1						1
BH-27	Bulk									1					1
BH-28	Bulk						2		1	8					11
BH-32	Bulk						1			11					12
BH-33	Bulk									1					1
BH-2, No Prov.						1									1
	Surface									2		2			4
HP-2, TU-1	2									1		1		1	3
	3								1	1					2
	12									1					1
	13									2					2
HP-2, TU-2	4									1					1
	5									1					1
	12									2					2
	13						1			1					2
	14									1					1
	15									1					1
HP-2, TU-3	14									1					1

APPENDIX E--(Continued)

Unit	Level	Projectile Points	Projectile Point Fragments: Tip	Projectile Point Fragments: Base	Projectile Point Fragments: Stem	Biface	Biface Fragments	Scraper and Scraper Fragments	Reworked Flakes	Utilized Flakes	Exhausted Cores with Utilized Edge	Anvil Stone	Cobble Chopper	Other	Total
HP-2, TU-5	3													1	1
	16						1								1
	19						1			1					2
HP-3, Cut Face							1			3					4
HP-3, TU-1	4									1					1
	5									2					2
	6						2	1	1	3					7
	7									1					1
HP-3, TU-2	5	2		1			1		1	8	7				20
	6									3					3
	7								1						1
HP-5, TU-1	5				1		1								2
	10									1					1
	12	1	1							1					3
	13						1								1
HP-5, TU-1-N	7									2					2
HP-5, TU-1-S	4									1					1
	7							1							1
HP-6, TU-1	5				1										1
	11						1								1

APPENDIX E--(Continued)

Unit	Level	Projectile Points	Projectile Point Fragments			Biface	Biface Fragments	Scraper and Scraper Fragments	Reworked Flakes	Utilized Flakes	Exhausted Cores with Utilized Edge	Anvil Stone	Cobble Chopper	Other	Total
			Tip	Base	Stem										
HP-6, TU-1-N	6									1					1
	7									1					1
	8							2							2
	9									1					1
	12								1	1					2
HP-6, TU-1-S	3									1					1
	7						1								1
TU-A	8									1					1
	13										1			1	2
TU-D	4									1					1
	6						1								1
	7									1					1
	15									1					1
TU-E	1									1					1
	7									1					1
	9								1						1
	11									1					1

APPENDIX F

by Deborah L. Olson

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
HP2 TU1	2	2	6	2			10
	3	1	10	1			12
	4		18	3	2		23
	5		7				7
	6		8	1			9
	7		2	1	1		4
	8	1	4				5
	9	1	3	1			5
	11	1	3	1			5
	12		10	1			11
	13	1	10				11
	14	1	10	2	1		14
	15		9	2			11
	16		5				5
	TOTAL	7	108	14	4	0	133
HP2 TU2	3		1				1
	4	1	2	1			4
	5		8	2	1		11
	6		10				10
	7	1	6	1			8
	8		10	2			12
	9	1	4	1			6
	10	1	9	1			11
	11	1	13				14
	12	1	17	4			22
	13	1	24	6			31
	14		13				13
	15		4	3			7
	16		3				3
	TOTAL	7	124	21	1	0	153
HP2 TU3	12	2	50	8			60
	13	1	33	5			39
	14	2	16				18
	15		11				11
	16		3				3
	TOTAL	5	113	13	0	0	131
HP2 TU4	16		15	3			18
	17		14	3			17
	18		4	3			7
	19		1				1
	TOTAL	0	34	9	0	0	43

APPENDIX F.--(Continued)

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
HP2 TU5	16	1	23	4			28
	17		8	2			10
	18	1	28	4			33
	19	4	25	6			35
	20	1	11	1			13
	TOTAL	7	95	17	0	0	119
HP2 --		1	7	1			9
	TOTAL	1	7	1	0	0	9
HP2 Clearing			3	3			6
	TOTAL	0	3	3	0	0	6
HP3 TU1	3	1	10				11
	4	1	28	11			40
	5	4	41	14			59
	6	9	93	11			113
	7	2	36	1			39
	TOTAL	17	208	37	0	0	262
HP3 TU2	Surface		6				6
	1	1	7				8
	2	2	6	3			11
	3	3	28	1	1		33
	4	3	21		1		25
	5	8	194	38	14		254
	6	12	64	14			90
	7	1	9	1			11
	TOTAL	30	335	57	16	0	438
HP3 Cutface			17	7			24
	TOTAL	0	17	7	0	0	24
HP5 TU-N	2	1	4				5
	3	3	19	1	1		24
	4		11	2	1		14
	5	2	27	5			34
	6		21				21
	7		23	2			25
	8	5	28	5			38
	9	3	41	5			49
	10	1	29	5			35
	11		12				12
	12		8	1			9
	13	1					1
	TOTAL	16	223	26	2	0	267

APPENDIX F.--(Continued)

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
HP5 TU-S	4		4				4
	5		14	1			15
	6	2	19	3			24
	7		16	3			19
	8	6	37	5			48
	9	1	37	3			41
	10		171	7	2		180
	11	1	7				8
	12		6				6
	13		3				3
	TOTAL	10	314	22	2	0	348
HP6 TU-N	3		5	1			6
	4		3				3
	5	1	6	1			8
	6	1	16	2			19
	7	1	19	6			26
	8	1	21	4			26
	9	3	21	4			28
	10		27	2	2		31
	11	2	25	2			29
	12	1	10	2			13
	13		1				1
	TOTAL	10	154	24	2	0	190
HP6 TU-S	1		2				2
	2		2				2
	3		3				3
	4		6	1			7
	5		10	2			12
	6	2	13	2			17
	7		14	2			16
	8		13	3			16
	9	2	10				12
	10		4				4
	11	2	2	1			5
	12		1				1
	TOTAL	6	80	11	0	0	97
Between HP1 and 2		1	11	4			16
	TOTAL	1	11	4	0	0	16
BH Trench near BH19			3				3
	TOTAL	0	3	0	0	0	3

APPENDIX F.--(Continued)

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
HP1 TU1	10		11	1			12
	TOTAL	0	11	1	0	0	12
BH1	5		1				1
	6		1				1
	TOTAL	0	2	0	0	0	2
BH2	2			1	1		2
	4		3				3
	5	1	2				3
	6	1	1				2
	7		1		1		2
	8	1	1				2
	TOTAL	3	8	1	2	0	14
BH3	1		1				1
	2		3				3
	3	1	4	1			6
	4	1	1				2
	5		1	1	1		3
	6	1	7				8
	7		4				4
	8		2	1			3
	9		3				3
	10		5	2			7
	11		2				2
	12		2	1			3
	TOTAL	3	35	6	1	0	45
BH6	1	1	9	2			12
	2/3	3	12	4	1		20
	4	1	3	1			5
	5					1	1
	6		1				1
	8	1	1	1			3
	9		1				1
	10	1					1
	12		2				2
	TOTAL	7	29	8	2	0	46
BH7	3		1				1
	TOTAL	0	1	0	0	0	1

APPENDIX F.--(Continued)

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
BH8	1		1				1
	4		1				1
	6		1				1
	8		1				1
	TOTAL	0	4	0	0	0	4
BH9	5		1				1
	TOTAL	0	1	0	0	0	1
BH10	2		1				1
	TOTAL	0	1	0	0	0	1
BH13	2		1				1
	4/5			1			1
	TOTAL	-	1	1	0	0	2
BH14	-		1	1	1		3
	1	1	7				8
	2		5	2			7
	3	2	6	1			9
	4	2	7	1	1		11
	5	3	10	4			17
	6		12				12
	7	4	8	3	1		16
	8		15				15
	9	2	11		1		14
	11		1				1
	12		1				1
	TOTAL	14	84	12	4	0	114
BH15	2	1	6		1		8
	3	2	5	2			9
	4	5	12				17
	5	3	8	2			13
	6	3	11	3			17
	7	2	5	1			8
	8		1				1
	TOTAL	16	48	8	1	0	73
BH16	1		7	1			8
	2	1	5	1			7
	3	3	4				7
	4	2	4				6
	5	4	8				12
	6	1	9	1			11

APPENDIX F.--(Continued)

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
BH16 (cont.)	7		8				8
	8	2	1				3
	9	1	2				3
	10		4				4
	11		1				1
	13		2				2
	TOTAL	14	55	3	0	0	72
BH17	3		2				2
	6		2				2
	TOTAL	0	4	0	0	0	4
BH19	4		7				7
	5	2	14	6			22
	6	1	18	5			24
	7	4	18	3			25
	8	3	26	7			36
	9	5	46				51
	10	3	22				25
	11	4	9			1	14
	12	1	6				7
	13	1	8	1			10
	14		6	1			7
	TOTAL	24	180	23	1	0	228
BH20	1	1	5				6
	3		1				1
	4		1				1
	5		1	1			2
	6		1				1
	9	1	3				4
	10		1				1
	14		2				2
	TOTAL	2	15	1	0	0	18
BH21	4	1					1
	6		1				1
	10		2				2
	TOTAL	1	3	0	0	0	4
BH22	2	1	2				3
	3	1		1			2
	4		2		1		3
	6	3	7	1	1		12
	7		1				1

APPENDIX F.--(Continued)

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
BH22 (cont.)	9		2				2
	10		1				1
	12		1				1
	14		1				1
	TOTAL	5	17	2	2	0	26
BH19	Bulk	8	45	7	2		62
	TOTAL	8	45	7	2	0	62
BH27	Bulk	6	228	26			150
	TOTAL	6	228	26	0	0	150
BH28	Bulk	23	304	50	5		382
	TOTAL	23	304	50	5	0	382
BH32	Bulk	3	43	8			54
	TOTAL	3	43	8	0	0	54
BH33	Bulk	10	18	1			29
	TOTAL	10	18	1	0	0	29
TU-A	4	2	2	1			5
	5	3	6				9
	7	1	2				3
	8	1	5	1			7
	9	2	4				6
	10	1	7	3			11
	11	2	9	1			12
	12	7	21	8			36
	13	5	18				23
	14		1				1
	TOTAL	24	75	14	0	0	113
TU-B	1	1	3	2			6
	2	2	10				12
	3	2	11	1			14
	4		19	3			22
	5	4	11				15
	6	2	4	2			8
	7		3	1			4
	TOTAL	11	61	9	0	0	81
TU-C	1	1	1	3			5
	2		1				1
	3		7				7
	4	1	2				3

APPENDIX F.--(Continued)

Lithic Debitage

Unit	Level	Decort.	Thinning	Shatter	Core	Other	Total
TU-C (cont.)	5		4	1			5
	6	2	4	1			7
	7		10	1			11
	8		11	1			12
	TOTAL	4	40	7	0	0	51
TU-D	2		5				5
	3		2				2
	4		3	1			4
	5		3				3
	6	1	2	2			5
	7	4	4	1			9
	8	2	5	2	1		10
	9	3	4	3			10
	10		6	3			9
	11	2	3	1			6
	12	1	6	1			8
	13	1	7	1			9
	14	1	9	2			12
	15		16				16
	TOTAL	15	75	17	1	0	108
TU-E	1		1	1			2
	2		10				10
	3	1	18	1			20
	4		6	1			7
	5		6	3			9
	6		3	2			5
	7		1	1	1		3
	8		12	1			13
	9		4				4
	10		1	1			2
	11		1				1
	12		4				4
	TOTAL	1	67	11	1	0	80
TU-F	2		1				1
	4		2				2
	6	1		1			2
	7		1				1
	8	1	1				2
	9	1	1				2
	TOTAL	3	6	1	0	0	10

DATE

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